MC9190-G

Integrator Guide

MC9190-G Integrator Guide

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Revision History

Changes to the original manual are listed below:

Change	Date	Description
Rev A	02/4/11	Initial release.

Table of Contents

Revision History iii

About This Guide

Introduction xiii
Documentation Set xiii
Configurations xiii
Software Versions xiv
AKU Version for Mobile 6.5 Devices xiv
OEM Version xiv
BTExplorer Software xiv
Fusion Software xiv
Chapter Descriptions xv
Notational Conventions xv
Related Documents and Software xvi
Service Information xvi

Chapter 1: Getting Started

Introduction 1-1
Unpacking the MC9190-G 1-1
Configuring the MC9190-G 1-1
Resetting the MC9190-G 1-2
Windows CE 6.0 Devices 1-2
Performing a Warm Boot 1-2
Performing a Cold Boot 1-2
Windows Mobile 6.5 Devices 1-2
Performing a Warm Boot 1-3
Performing a Cold Boot 1-3
Performing a Clean Boot 1-3
Battery Management 1-4
Battery Saving Tips 1-4
Changing the Power Settings 1-4
Changing the Display Backlight Settings 1-4
Changing the Keypad Backlight Settings 1-5

Turning Off the Radios 1-5
On Devices with Mobile 6.5 1-5
On Device with CE 6.0 1-6
WLAN Radio 1-6
Bluetooth Radio 1-6

Chapter 2: Accessories
Introduction 2-1
Keypads 2-4
Replacing the Keypad 2-4
Secure Device (SD) Card 2-5
Single Slot Serial/USB Cradle 2-7
Setup 2-8
Battery Charging Indicators 2-9
Four Slot Ethernet Cradle 2-10
Setup 2-11
Battery Charging Indicators 2-11
Ethernet Communication Setup 2-12
Installing MobileDox Cradle Manager 2-12
Installing iDockIt 2-12
MC9190-G Configuration 2-13
DHCP Server Configuration 2-13
Cradle Configuration 2-13
Four Slot Charge Only Cradle 2-17
Setup 2-18
Battery Charging Indicators 2-18
Four Slot Spare Battery Charger 2-19
Setup 2-20
Spare Battery Charging with the Four Slot Spare Battery Charger 2-20
Battery Charging Indicators 2-20
Magnetic Stripe Reader 2-21
Attaching and Removing 2-22
Setup 2-22
Battery Charging Indicators 2-23
Serial/USB Connection 2-23
Using the MSR 2-23
Cable Adapter Module 2-24
Attaching and Removing 2-25
Setup 2-25
Battery Charging Indicators 2-26
Serial/USB Connection 2-26
Universal Battery Charger (UBC) Adapter 2-27
Inserting and Removing a Battery 2-27
Setup 2-28
Battery Charging Indicators 2-28
Modem Module 2-29
Setup 2-30
Connecting to the MC9190-G 2-30
Connecting to the Single Slot Serial/USB Cradle 2-31

Configuring the MC9190-G for the Modem (Windows Mobile 6.5) 2-31
Configuring the MC9190-G for the Modem (Windows CE 6.0) 2-32
Connecting the Modem (Windows Mobile 6.5) 2-32
Connecting the Modem (Windows CE 6.0) 2-32
Changing the Initialization String (Windows CE 6.0) 2-32
Serial Communication Setup 2-34
Setting Up a Connection on the MC9190-G (Windows Mobile 6.5) 2-34
Serial Connection Setup (Windows CE 6.0) 2-35
USB Host Communication Setup 2-37
Wall Mounting Bracket and Shelf Slide 2-38
Installing the Wall Mount Bracket 2-38
Attaching the Shelf Slide to the Wall Mount Bracket 2-39
One Single Slot Cradle/Four Slot Battery Charger 2-39
Two Single Slot Cradles/Four Slot Battery Chargers 2-39
Four Slot Cradle 2-40
Installing the Cradle/Charger on the Bracket 2-40

Chapter 3: Synchronization
Introduction 3-1
Installing the Sync Software 3-1
MC9190-G Setup 3-2
Setting Up a Sync Connection 3-2
ActiveSync 3-2
Windows Mobile Device Center 3-3
Setting up a Partnership with a Windows CE 6.0 Device 3-4
Synchronization With a Windows Mobile 6.5 Device 3-6

Chapter 4: Wireless Applications
Introduction 4-1
Windows CE Devices 4-1
Windows Mobile 6.5 Devices 4-2
Fusion Applications 4-3
Signal Strength Icon 4-3
Turning Off the Radio 4-4
On Device with Windows CE 4-4
On Device with Windows Mobile 4-4

Chapter 5: Application Deployment for Windows CE
Introduction 5-1
Packaging 5-1
Software Installation on Development PC 5-1
Platform SDK 5-2
EMDK for C 5-2
Installing Other Development Software 5-3
Software Updates 5-3
Windows CE Flash Storage 5-3
FFS Partitions 5-3

Working with FFS Partitions 5-3
RegMerge.dll 5-4
CopyFiles 5-4
Non-FFS Partitions 5-4
Downloading Partitions to the MC9190-G 5-5
Bootloader 5-5
Partition Update vs. File Update 5-5
Upgrade Requirements 5-5
Deployment 5-6
Copying Files from a Host Computer 5-6
Adding Programs 5-7
Adding a Program from the Internet 5-8
Updating Images 5-8
Windows CE 6.0 OSUpdate Loader 5-8
Bootloader 5-9
Bootloader Error Detection 5-13
Mobility Services Platform 5-15
Creating a Splash Screen 5-16

Chapter 6: Application Deployment for Windows Mobiles
Introduction 6-1
Security 6-1
Application Security 6-1
Digital Signatures 6-1
Locking Down a MC9190-G 6-2
Installing Certificates 6-3
Device Management Security 6-3
Remote API Security 6-3
XML Provisioning 6-4
Creating an XML Provisioning File 6-4
XML Provisioning vs. RegMerge and Copy File 6-4
RegMerge 6-5
CopyFiles 6-5
Packaging 6-6
Software Installation on Development PC 6-6
EMDK for C 6-7
Installing Other Development Software 6-7
Software Updates 6-7
Windows Mobile File Storage 6-7
Random Access Memory 6-7
Volatile File Storage (Cache Disk) 6-8
Persistent Storage 6-8
Application Folder 6-8
Deployment 6-8
Installation Using ActiveSync 6-9
Installation Using Storage Card 6-9
Installation Using USB Connection 6-9
Installation Using AirBEAM 6-10
Mobility Services Platform 6-10

Update Loader Image 6-10
Download Update Loader Package 6-10
ActiveSync 6-11
SD Card 6-11
Creating a Splash Screen 6-11

Chapter 7: Interactive Sensor Technology Configuration
Introduction 7-1
IST Menu 7-1
General Tab 7-2
Power Management Tab 7-3
Keep Alive On Motion 7-3
On Face Down 7-3
Wake Up on Motion 7-4
Setting Sensitivity 7-4
Display Tab 7-4
Event Log Tab 7-5
Motion Event Details 7-5

Chapter 8: Maintenance & Troubleshooting
Introduction 8-1
Maintaining the MC9190-G 8-1
Battery Safety Guidelines 8-1
Cleaning 8-2
Approved Cleanser Active Ingredients 8-2
Harmful Ingredients 8-3
Cleaning Instructions 8-3
Special Cleaning Notes 8-3
Materials Required 8-3
Cleaning the MC9190-G 8-3
Housing 8-3
Display 8-3
Scanner Exit Window 8-3
Battery Contacts 8-3
Cleaning Cradle Connectors 8-4
Cleaning Frequency 8-4
Troubleshooting 8-5
MC9190-G 8-5
Bluetooth Connection 8-7
Four Slot Charge Only Cradle 8-8
Four Slot Ethernet Cradle 8-8
Four Slot Spare Battery Charger 8-10
Single Slot Serial/USB Cradle 8-10
Cable Adapter Module 8-11
Magnetic Stripe Reader 8-12
Modem Module 8-13

Appendix A: Technical Specifications

MC9190-G Specifications A-1
Decode Zones A-5
SE960 Standard Range Laser Decode Zones A-5
SE1524 Long Range Laser Decode Zones A-7
SE4500 Standard Range Imager Decode Zones A-9
SE4500-SR A-9
SE4500-DL A-11
SE4500-HD A-13
SE4600 Long Range Imager Decode Zones A-15
Mobile Computer Pin-Outs A-18
Accessory Specifications A-20
Single Slot Serial/USB Cradle A-20
Four Slot Ethernet Cradle A-20
Four Slot Charge Only Cradle A-21
Four Slot Battery Charger A-21
Magnetic Stripe Reader A-22
Accessory CAM and MSR Pin-Outs A-22

Appendix B: Using iDockIt

Introduction B-1
General Recommendations B-2
Prepare the MC9190-G To Connect B-2
Enable iDockIt To Manage Connections Automatically B-2
Enable iDockIt To Manage Connections Manually B-2
Launch Application Upon Connection B-3
View Connection Status B-3
Minimize iDockIt B-3
Exit iDockIt B-3
Windows Mobile 6.5 Configuration B-4
General Tab B-4
Ethernet Tab B-5
Direct Tab B-6
Modem Tab B-7
Create A New Modem Connection B-8
Edit an Existing Modem Connection B-9
Delete an Existing Modem Connection B-9
Status Tab B-9
Windows CE 6.0 Configuration B-11
General Tab B-11
Ethernet Tab B-12
Direct Tab B-13
USB Notes B-14
Modem Tab B-15
Create A New Modem Connection B-16
Edit An Existing Modem Connection B-16
Delete An Existing Modem Connection B-17
Status Tab B-17
Un-installing iDockIt B-18

Appendix C: Special Software Configurations
Bluetooth Configuration Setting C-1
Sample Applications and StartUpCtl Configuration C-2
StartUpCtl Application Configuration C-2
Removing Sample Applications and StartUpCtl Application C-2
Switching Between QVGA and VGA Resolution in Windows CE Devices C-3
Battery Usage Threshold Setting C-4
Registry Setting C-4
WLAN Default Settings C-5

Glossary

Index

About This Guide

Introduction

This guide provides information about setting up and configuring the MC9190-G and accessories.

NOTE Screens and windows pictured in this guide are samples and can differ from actual screens.

Documentation Set

The documentation set for the MC9190-G is divided into guides that provide information for specific user needs.

- **MC9190-G User Guide** - describes how to use the MC9190-G.
- **MC9190-G Integrator Guide** - describes how to set up the MC9190-G and the accessories.
- **EMDK Help File** - provides API information for writing applications.

Configurations

This guide covers the following configurations:

Configuration	Radios	Display	Memory	Data Capture	Operating System	Keypads
MC9190-G	WLAN: 802.11a/b/g WPAN: Bluetooth	Color	256 MB RAM / 1 GB Flash	Laser, Long Range Laser, Standard Range Imager (HD, DL, SR) or Long Range Imager	Windows CE 6.0 or Mobile 6.5	28-key, 43-key, 53-key, VT, 3270, 5250 Emulators

Software Versions

This guide covers various software configurations and references are made to operating system or software versions for:

- Adaptation Kit Update (AKU) version
- OEM version
- BTExplorer version
- Fusion version.

AKU Version for Mobile 6.5 Devices

To determine the Adaptation Kit Update (AKU) version on a Mobile 6.5 device:

Tap **Start** > **Settings** > **System** tab > **About** icon > **Version** tab.

The second line lists the operating system version and the build number. The last part of the build number represents the AKU number. For example, *Build 14929.2.2.1* indicates that the device is running AKU version *2.2.1*.

OEM Version

To determine the OEM software version:

On Mobile 6.5, tap **Start** > **Settings** > **System** > **System Information** > **System**.

On CE 6.0, tap **Start** > **Settings** > **Control Panel** > **System Information** > **System**.

BTExplorer Software

NOTE By default, the Microsoft Bluetooth stack is enabled. BTExplorer application is only available when the StoneStreet One Bluetooth stack is enabled. See *Appendix C, Special Software Configurations* for information on selecting the Bluetooth stack.

To determine the BTExplorer software version:

On Mobile 6.5, tap **Start** > **BTExplorer** > **Menu** > **About**.

On CE 6.0, tap **BTExplorer** icon > **Show BTExplorer** > **File** > **About**.

Fusion Software

To determine the Fusion software version:

On Windows Mobile 6.5, tap **Wireless Strength** icon > **Wireless Status** > **Versions**.

On Windows CE 6.0, tap **Wireless Strength** icon > **Wireless Status** > **Versions or tap Start** > **Programs** > **Fusion** > **Wireless Status** > **Versions**.

Chapter Descriptions

Topics covered in this guide are as follows:

- *Chapter 1, Getting Started*, provides information on setting up the MC9190-G.
- *Chapter 2, Accessories*, describes the accessories available for the MC9190-G and how to set up power connections and battery charging capabilities, where applicable.
- *Chapter 3, Synchronization*, provides instructions on installing ActiveSync and setting up a partnership between the MC9190-G and a host computer.
- *Chapter 4, Wireless Applications*, provides instructions using and configuring the MC9190-G on a wireless network.
- *Chapter 5, Application Deployment for Windows CE*, provides instructions for installing the Device Configuration Package (DCP) for MC9190 and the SMDK for C on the host computer and downloading software and files to the MC9190-G.
- *Chapter 6, Application Deployment for Windows Mobiles*, describes the features in Windows Mobile 6.5 including new security features, how to package applications, and procedures for deploying applications onto the MC9190-G.
- *Chapter 7, Interactive Sensor Technology Configuration*, describes how to configure interactive sensing technology on the MC9190-G.
- *Chapter 8, Maintenance & Troubleshooting*, includes instructions on cleaning and storing the MC9190-G, and provides troubleshooting solutions for potential problems during MC9190-G operation.
- *Appendix A, Technical Specifications*, includes a table listing the technical specifications for the MC9190-G.
- Appendix B, Using iDockIt, provides *iDockIt* software operating instructions.
- *Appendix C, Special Software Configurations*, provides information for configuring Bluetooth and sample applications.

Notational Conventions

The following conventions are used in this document:

- “Mobile computer” refers to the Motorola MC9190-G hand-held computer.
- *Italics* are used to highlight the following:
  - Chapters and sections in this guide
  - Related documents
- **Bold** text is used to highlight the following:
  - Dialog box, window and screen names
  - Drop-down list and list box names
  - Check box and radio button names
  - Icons on a screen
  - Key names on a keypad
  - Button names on a screen.

- Bullets (•) indicate:
  - Action items
  - Lists of alternatives
  - Lists of required steps that are not necessarily sequential.
- Sequential lists (e.g., those that describe step-by-step procedures) appear as numbered lists.

Related Documents and Software

The following documents provide more information about the MC9190-G.

- *MC9190-G Quick Start Guide,* p/n 72-139206-xx
- *MC9190-G Regulatory Guide*, p/n 72-139207-xx
- *MC9190-G User Guide*, p/n 72E-140936-xx
- *Enterprise Mobility Developer Kits,* available at: http://supportcentral.motorola.com
- Device Configuration Package (DCP for MC9190c60) and Platform SDK (PSDK9190c60) for MC9190-G with Windows CE 6.0*,* available at: http://supportcentral.motorola.com
- Microsoft Sync software, available at: http://www.microsoft.com.

For the latest version of this guide and all guides, go to: http://supportcentral.motorola.com.

Service Information

If you have a problem with your equipment, contact the “Motorola Global Interactive Center,” for your region. Go to http://www.motorola.com/contactsupport. If you purchased your Motorola product from a Motorola Business Partner, contact that Business Partner for service.

Before contacting, have the model number and serial number at hand. If your problem cannot be solved by the Motorola Global Interactive Center, you may need to return your equipment for servicing and you will be given specific directions.

Motorola is not responsible for any damages incurred during shipment if the approved shipping container is not used. Shipping the units improperly can possibly void the warranty.

Chapter 1 Getting Started

Introduction

This chapter provides information for setting up the MC9190-G.

Unpacking the MC9190-G

Carefully remove all protective material from around the MC9190-G and save the shipping container for later storage and shipping.

Verify that you received all equipment listed below:

- MC9190-G
- lithium-ion battery
- strap, attached to the MC9190-G
- stylus, in the stylus silo
- Regulatory Guide
- Quick Start Guide.

Inspect the equipment for damage. If you are missing any equipment or if you find any damaged equipment, contact the Motorola Support Center immediately. See *Service Information on page xvi* for contact information.

Configuring the MC9190-G

- To set up ActiveSync to synchronize the MC9190-G with the host computer, see *Chapter 3, Synchronization*.
- To configure the MC9190-G for wireless LAN network, see *Chapter 4, Wireless Applications*.
- To deploy software on the MC9190-G, see *Chapter 5, Application Deployment for Windows CE* or *Chapter 6, Application Deployment for Windows Mobiles*.

Resetting the MC9190-G

Windows CE 6.0 Devices

There are two reset functions, warm boot and cold boot. A warm boot restarts the MC9190-G by closing all running programs.

A cold boot also restarts the MC9190-G, but erases all stored records and entries in RAM. Data saved in flash memory or a memory card is not lost. In addition it returns formats, preferences and other settings to the factory default settings.

Perform a warm boot first. This restarts the MC9190-G and saves all *stored* records and entries. If the MC9190-G still does not respond, perform a cold boot.

Performing a Warm Boot

Hold down the **Power** button for approximately five seconds. As soon as the MC9190-G starts to perform a warm boot release the **Power** button.

Performing a Cold Boot

A cold boot restarts the MC9190-G and erases all user stored records and entries that are not saved in flash memory (Application and Platform folders) or a memory card. *Never perform a cold boot unless a warm boot does not solve the problem.*

CAUTION Do not hold down any key, other than the **Power** button during a reset. Performing a cold boot restores formats, preferences and other settings to the default settings.

NOTE Any data previously synchronized with a computer can be restored during the next ActiveSync operation.

To perform a cold boot:

1. Press the primary battery release on the MC9190-G to partially eject the battery from the MC9190-G.
2. While the battery is partially released, simultaneously press and release the handle trigger and the **Power** button.
3. Push the battery to fully re-insert it in the MC9190-G. One audible click can be heard as the battery is fully inserted.
4. The MC9190-G initializes.
5. Calibrate the screen.

Windows Mobile 6.5 Devices

There are three reset functions, warm boot, cold boot and clean boot.

- A warm boot restarts the MC9190-G and closes all running programs.
- A cold boot also restarts the MC9190-G and closes all running programs but also resets the Real-Time-Clock (RTC).
- A clean boot resets the MC9190-G to the factory default settings.

Data saved in flash memory or a memory card is not lost. Perform a warm boot first. This restarts the MC9190-G and saves all *stored* records and entries. If the MC9190-G still does not respond, perform a cold boot.

Performing a Warm Boot

Hold down the Power button for approximately five seconds. As soon as the MC9190-G starts to perform a warm boot release the **Power** button.

Performing a Cold Boot

A cold boot restarts the MC9190-G. The operating system and all applications are restarted. File storage is preserved. The Real-Time-Clock (RTC) resets. *Only perform a cold boot if a warm boot does not solve the problem.*

To perform a cold boot:

1. Press the primary battery release on the MC9190-G to partially eject the battery from the MC9190-G.
2. While the battery is partially released, simultaneously press and release the trigger and the **Power** button.
3. Push the battery to fully re-insert it in the MC9190-G. One audible click can be heard as the battery is fully inserted.
4. The MC9190-G initializes.

Performing a Clean Boot

CAUTION A clean boot should only be performed by an authorized system administrator. You must connect the MC9190-G to AC power during a clean boot.

Removing AC power from the MC9190-G during a clean boot may render the MC9190-G inoperable.

A clean boot resets the MC9190-G to the factory default settings. All data is the **Application** folder is retained. You must download the Clean Boot Package file from the Motorola Support Central and install on the MC9190-G.

To perform a clean boot:

1. Download the Clean Boot Package from the Motorola Support Central. Follow the instructions included in the package for installing the package onto the MC9190-G.
2. Press the primary battery release on the MC9190-G to partially eject the battery from the MC9190-G.
3. While the battery is partially released, simultaneously press and release the trigger and the **Power** button.

NOTE After you insert the battery you have two seconds to press the trigger or left scan button.

4. Push the battery to fully re-insert it in the MC9190-G. One audible click can be heard as the battery is fully inserted.
5. Press and hold the trigger.
6. Connect the MC9190-G to AC power using the CAM or insert the MC9190-G into a powered cradle.
7. The MC9190-G updates and then re-boots.
8. The calibration screen appears.

Battery Management

Battery Saving Tips

- Leave the MC9190-G connected to AC power at all times when not in use.
- Set the MC9190-G to turn off after a short period of non-use.
- Set the display to turn off or dim the backlight.
- Set the keyboard backlight to turn off after a short period of non-use.
- Turn off all wireless radio activity when not in use.
- Power off the MC9190-G when charging to charge at a faster rate.

Changing the Power Settings

To set the MC9190-G to turn off after a short period of non-use:

1. On devices with Windows CE 6.0, tap **Start** > **Settings** > **Control Panel** > **Power** icon > **Advanced** tab.

   or

   On devices with Windows Mobile 6.5, tap **Start** > **Settings** > **System** > **Power** > **Advanced**.
2. Select the **On battery power: Turn off device if not used for:** check box and select a value from the drop-down list box.
3. Tap **OK**.

Changing the Display Backlight Settings

To change the display backlight settings in order to conserve more battery power:

1. On devices with Windows CE 6.0, tap **Start** > **Settings** > **Control Panel** > **Backlight** icon > **Battery Power** tab.

   or

   On devices with Windows Mobile 6.5, tap **Start** > **Settings** > **System** > **Backlight** > **Battery Power**.
2. Select the **On battery power: Disable backlight if not used for:** check box and select a value from the drop-down list box.
3. Tap **Brightness**.
4. Tap the **Disable backlight** check box to completely turn off the display backlight.
5. Tap the **Persist 'Disable backlight' setting over reset** check box to ensure that the **Disable backlight** setting is set after a reset.
6. Use the slider to set the brightness of the backlight. Set it to a low value to save battery power.
7. Tap **OK**.

Changing the Keypad Backlight Settings

To change the keypad backlight settings in order to conserve more battery power:

1. On devices with Windows CE 6.0, tap **Start** > **Settings** > **Control Panel** > **Keylight** icon > **Battery Power** tab.

   or

   On devices with Windows Mobile 6.5, tap **Start** > **Settings** > **System** > **Keylight** > **Battery Power**.

2. Select the **On battery power: Disable keylight if not used for:** check box and select a value from the drop-down list box.
3. Tap the **Advanced**.
4. Tap the **Disable keylight** check box to completely turn off the display backlight.
5. Tap the **Persist 'Disable keylight' setting over reset** check box to ensure that the **Disable keylight** setting is set after a reset.
6. Tap the **Track Backlight State** check box to (need information for this).
7. Tap **OK**.

Turning Off the Radios

On Devices with Mobile 6.5

Windows Mobile 6.5 devices include **Wireless Manager**, which provides a simple method of enabling, disabling, and configuring all the device's wireless capabilities in one place.

To open **Wireless Manager**, tap the Start Bar and then tap on the **Connectivity** icon.

Select **Wireless Manager**.

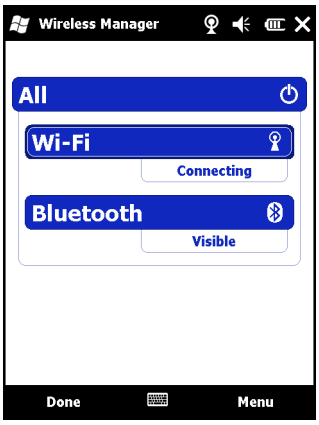


Figure 1-1 *Wireless Manager Window*

To enable or disable a wireless connection, tap its blue bar.

To enable or disable all wireless connections, tap and hold the **All** bar.

To configure settings for a connection, tap **Menu**.

On Device with CE 6.0

WLAN Radio

To turn off the WLAN radio, tap the **Wireless Connection Status** icon on the task tray and select **Disable Radio**. A red X appears across the icon indicating that the radio is disabled (off).

Figure 1-2 *Wireless Connection Status Icon*

To turn the radio back on, tap the **Wireless Connection Status** icon on the task tray and select **Enable Radio**. The red X disappears from the icon indicating that the radio is enabled (on).

Bluetooth Radio

To turn off the Bluetooth radio, tap **Bluetooth** icon in the task tray and select **Disable Bluetooth**.

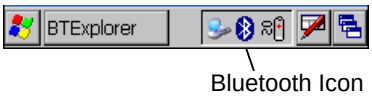


Figure 1-3 *Bluetooth Icon*

To turn on the Bluetooth radio, tap **Bluetooth** icon in the task tray and select **Enable Bluetooth**.

Chapter 2 Accessories

Introduction

Table 2-1 lists the accessories available for the MC9190-G.

Table 2-1 *MC9190-G Accessories*

Accessory	Part Number	Description
Cradles		
Single Slot Serial/USB Cradle	CRD9000-1001SR	Charges the MC9190-G main battery and a spare battery. It also synchronizes the MC9190-G with a host computer through either a serial or a USB connection.
Four Slot Charge Only Cradle	CHS9000-4001CR	Charges the MC9190-G main battery.
Four Slot Ethernet Cradle	CRD9000-4001ER	Charges the MC9190-G main battery and synchronizes the MC9190-G with a host computer through an Ethernet connection.
Forklift Cradle	FLC9000-1000R	Provides secure mounting solution for the MC9190-G. The cradle is equipped with rugged RS232 and USB ports which are capable of powering and communicating with tethered devices.
Chargers		
Four Slot Spare Battery Charger	SAC9000-4000R	Charges up to four MC9190-G spare batteries.
Universal Battery Charger Adapter	21-32665-48R	Charges an spare battery as a stand-alone charger or with the UBC2000 base.
UBC Four Slot Base	UBC2000-I500DR	Charges up to four batteries using the UBC adapter.
12 Volt Auto Charge Cable	VCA9001-12R	Plugs into a 12 volt cigarette lighter to charge the MC9190-G while on the road.

Table 2-1 *MC9190-G Accessories*

Accessory	Part Number	Description
24 Volt Auto Charge Cable	VCA9000-24R	Plugs into a 24 volt cigarette lighter to charge the MC9190-G while on the road.
Spare lithium-ion battery	KT-21-61261-01	Replacement battery.
UBC Adapter Power Supply Kit	KT-32665-02R	Provides power to the UBC adapter.
Power Supply	KT-14000-148R	Provides power to the Single Slot Serial/USB cradle. 100 - 240 VAC input, 12 VDC 3.33 A output.
Power Supply	PWRS-14000-148R	
Power Supply	PWRS-14000-242R	85 - 264 VAC input, 12 VDC 3.33 A output.
Power Supply	PWRS-14000-241R	Provides power to the Four Slot Charge Only cradle and Four Slot Ethernet cradle. 90 - 264 VAC input, 12 VDC 9 A output.
Cables		
DC Line Cord	50-16002-029R	Provides power from the power supply to the Four Slot Charge Only and Ethernet cradles.
DC Line Cord	25-72614-01R	
USB Sync Cable	25-64396-01R	Provides USB communication with a host computer through the Single Slot Serial/USB cradle.
RS232 Cable	25-62164-01R	Provides serial communication to the host computer or printer and can be used for AC charging.
USB Cable	25-62166-01R	Provides USB communication to the host.
DEX Cable with Floating Jack Screws	25-62167-03R	
Paxar Printer Cable	25-62168-01R	Connects the MC9190-G to a Paxar printer.
O'Neil Printer Cable	25-62169-01R	Connects the MC9190-G to an O'Neil printer.
Zebra Printer Cable	25-62170-02R	Connects the MC9190-G to a Zebra printer.
Modem Cable	25-63856-01R	Allows the Single Slot Serial/USB cradle to be used as a modem cradle.
Serial Cable	25-63852-01R	Provides serial communication from the Single Slot Serial/USB cradle to a host computer.
USB Cable	25-71918-01R	USB cable for FLC9000-1000R.
Serial Cable	25-71917-01R	Serial cable for FLC9000-1000R.
Soft Goods		
Holster	SG-MC91212112-01R	Holds the MC9190-G when not in use.
Belt	11-08062-02R	For use with holster.

Table 2-1 *MC9190-G Accessories*

Accessory	Part Number	Description
Protective Boot	11-67218-04R	Provides additional protection for MC90XX-G configurations.
Shoulder Strap	58-40000-007R	Universal shoulder strap for holster.
Snap-on		
Cable Adapter Module (CAM)	ADP9000-110R	Attaches to the bottom of the MC9190-G and provides power (5 VDC 350 mA) for use with the LS3408ER scanner.
Cable Adapter Module (CAM)	ADP9000-100R	Attaches to the bottom of the MC9190-G and provides power for operating change charging the MC9190-G and provides serial communication.
Magnetic Stripe Reader (MSR)	MSR9001-100R	Snaps on to the MC9190-G and adds magstripe read capabilities.
Modem Dongle	MDM9000-100R	Provides modem connectivity through the MC9190-G or the Single Slot Serial/USB cradle.
Miscellaneous		
MC90XX Wall Mounting Bracket	KT-61498-01R	Order one for Single Slot cradle and one for the SAC9000. Order two for Four Slot Cradles. Order Cradle Bracket separately to attach to the wall mount bracket.
MC90XX Cradle Bracket	KT-61499-01R	Order one for Single Slot cradle and one for the SAC9000. Order two for Four Slot Cradles. Attaches to the bottom of the cradle.
Screen Protector	KT-93176-03R	Adds an additional level of protection for the MC90XX screen to protect against scratches. (3-pack).
Stylus Kit	KT-81680-50R	Replacement gray stylus with tether for MC9190-G (50-pack).
Stylus Kit	KT-81680-03R	Replacement gray stylus with tether for MC9190-G (3-pack).
Belt Clip	KT-70147-01R	Attaches to a user's belt.
VXI Headset	50-11300-050R	Wired plug-in headset for superior and convenient use.
Rugged Cable Headset	RCH50	Rugged headset.
RCH50 Adapter Cable	25-124387-01R	RCH50 adapter cable for standard 3-pole, 2.5mm barrel jack used with MC9190-G.
UBC2000 Wall Mount Kit	KT-32665-01R	Use for mounting UBC2000 onto a wall.

Keypads

The MC9190-G has interchangeable modular keypads. The modular keypads can be changed in the field as necessary to support specialized applications.

NOTE Do not remove the keypad while the MC9190-G is on and do not operate the MC9190-G with the keypad detached. Follow proper Electro-Static Discharge (ESD) precautions to avoid damaging the SD card. Proper ESD precautions include, but are not limited to, working on an ESD mat and ensuring that the operator is properly grounded.

Replacing the Keypad

1. Press the **Power** button to suspend the MC9190-G.
2. Remove the two keypad screws. Slide the keypad down and lift up.

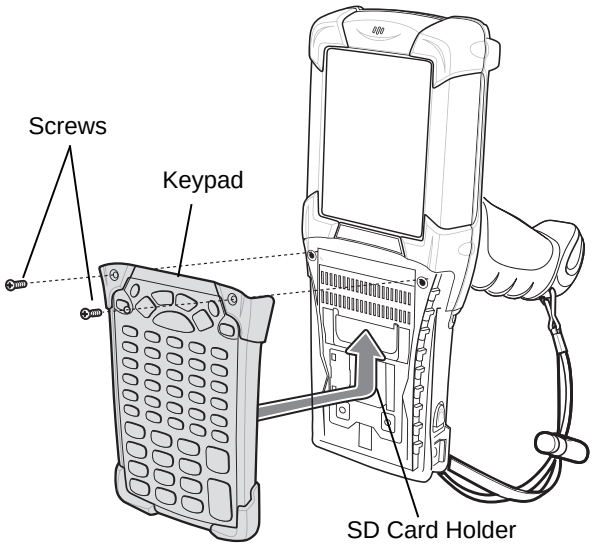


Figure 2-1 *Removing the Keypad*

CAUTION Do not apply more than 4 in-lbs of torque when tightening the keypad screws.

3. Replace the keypad and re-attach using the two screws.

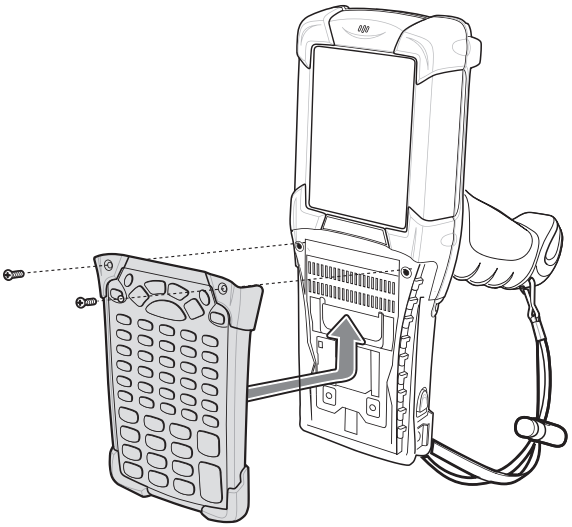


Figure 2-2 *Installing the Keypad*

4. Perform a warm boot.

Secure Device (SD) Card

The SD card provides secondary non-volatile storage. The SD card is located under the keypad (see *Figure 2-1*).

CAUTION Do not remove the keypad while the MC9190-G is on and do not operate the MC9190-G with the keypad detached. Follow proper ESD precautions to avoid damaging the SD card. Proper ESD precautions include, but are not limited to, working on an ESD mat and ensuring that the operator is properly grounded.

To insert the SD card:

1. Press the **Power** button to suspend the MC9190-G.
2. Remove the two keypad screws and slide the keypad down and lift off (see *Figure 2-1 on page 2-4*).
3. Lift the SD card retaining door.
4. Position the SD card, with the contacts down, into the SD card holder. The SD card corner notch fits into the holder only one way.
5. Snap the retaining door closed.

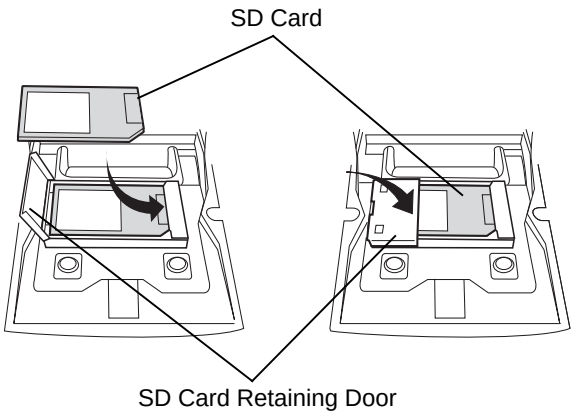


Figure 2-3 *Inserting the SD Card*

CAUTION Do not apply more than 4 in-lbs of torque when tightening the keypad screws.

6. Replace the keypad and re-attach using the two screws (see *Figure 2-2 on page 2-5*).
7. Perform a warm boot.

Single Slot Serial/USB Cradle

CAUTION Ensure that you follow the guidelines for battery safety described in *Battery Safety Guidelines on page 8-1*.

This section describes how to set up and use a single Single Slot Serial/USB cradle with the MC9190-G. For serial and USB communication setup procedures see *Serial Communication Setup on page 2-34*.

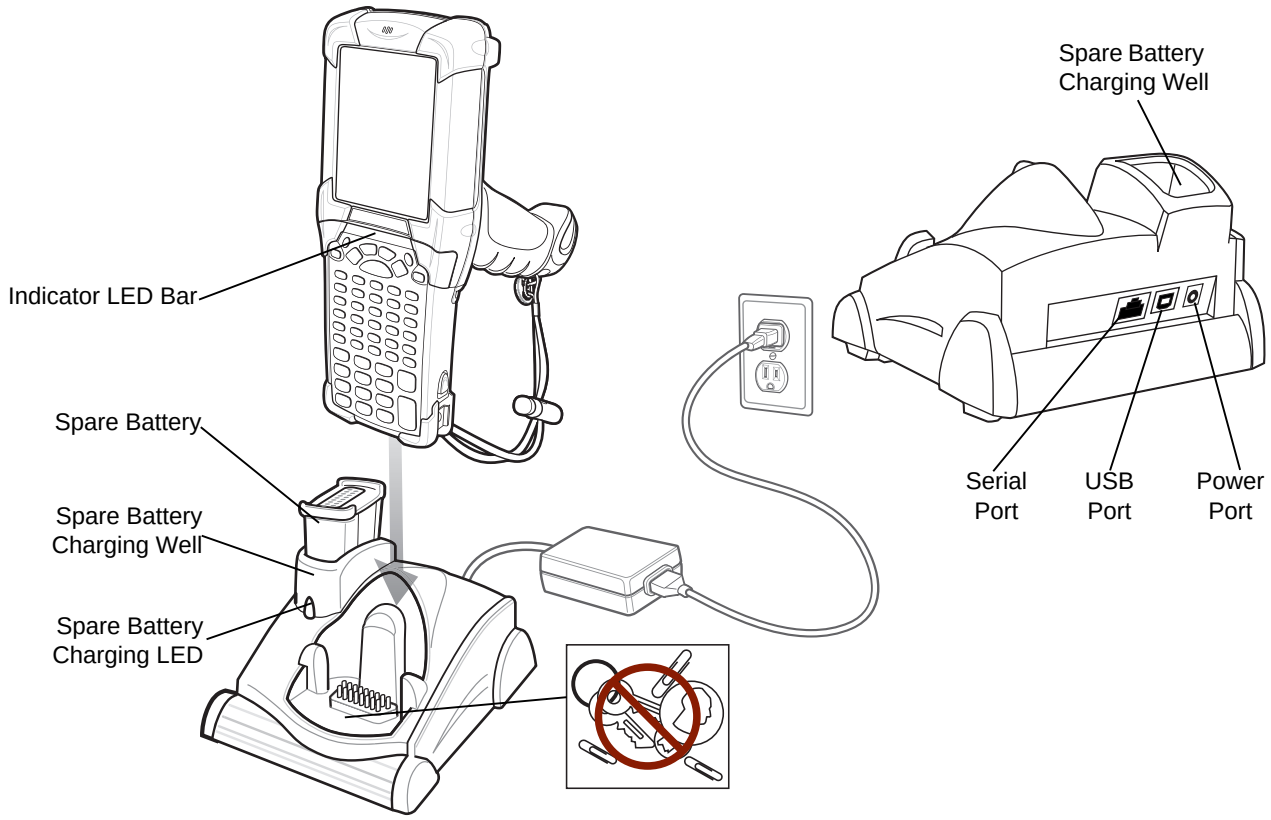


Figure 2-4 *Single Slot Serial/USB Cradle*

CAUTION Do not place coins, keys or paper clips in cradle well.

The Single Slot Serial/USB Cradle:

- Provides 15VDC power for operating the MC9190-G.
- Provides serial and USB ports for data communication between the MC9190-G and a host computer or other serial devices (e.g., a printer).

NOTE When an MC9190-G with Windows Mobile 6.5 is placed in the cradle and an ActiveSync connection is made, the WLAN radio is disabled. This is a Microsoft security feature to prevent connection to two networks at the same time.

- Synchronizes information between the MC9190-G and a host computer. (With customized or third party software, it can also be used to synchronize the MC9190-G with corporate databases.)

- Charges the MC9190-G's battery.
- Charges a spare battery.

Setup

NOTE The cradle requires a dedicated port on the host. Select either serial or USB for communications. Do not connect the cradle to both serial and USB ports.

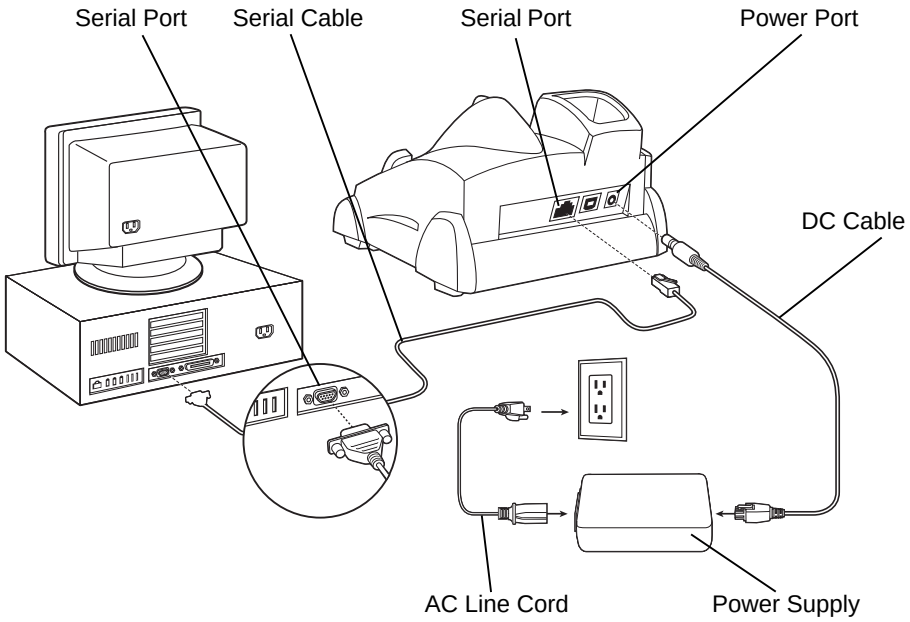


Figure 2-5 *Single Slot Cradle Power/Serial Connections*

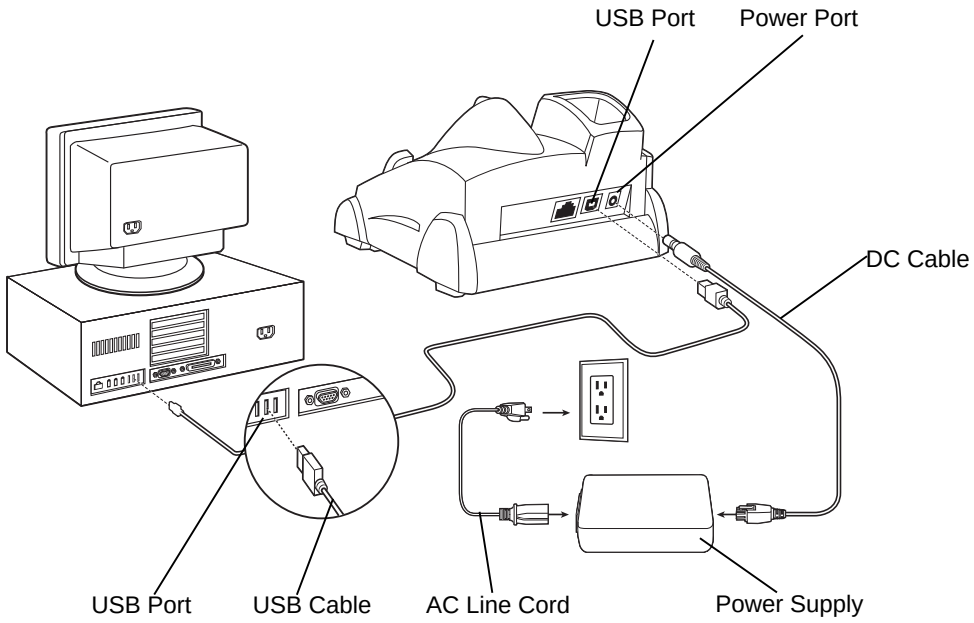


Figure 2-6 *Single Slot Cradle Power/USB Connections*

Battery Charging Indicators

The Single Slot Serial/USB Cradle can charge the MC9190-G main battery and a spare battery simultaneously. The MC9190-G's amber charge LED, located in the Indicator LED Bar, shows the status of the battery charging in the MC9190-G. See *Table 2-2* for charging status indications. The amber spare battery charging LED on the cradle (see *Figure 2-4 on page 2-7*) shows the status of the spare battery charging in the cradle. See *Table 2-3* for charging status indications. Batteries usually charge in less than four hours.

Table 2-2 *MC9190-G LED Charging Indicators*

Spare Battery LED (on cradle)	Indication
Off	MC9190-G is not in the cradle or connected to a CAM. MC9190-G is not placed correctly in the cradle. Charger is not powered.No spare battery in well; spare battery not placed correctly; cradle is not powered.
Fast Blinking Amber	Error in charging; check placement of the MC9190-G.
Slow Blinking Amber	MC9190-G is charging.
Solid Amber	Charging is complete. Note: When the battery is initially inserted in the MC9190-G, the amber LED flashes once if the battery power is low or the battery is not fully inserted.

Table 2-3 *Spare Battery LED Charging Indicators*

Spare Battery LED (on cradle)	Indication
Off	No spare battery in well; spare battery not placed correctly; cradle is not powered.
Fast Blinking Amber	Error in charging; check placement of spare battery.
Slow Blinking Amber	Spare battery is charging.
Solid Amber	Charging complete.

Four Slot Ethernet Cradle

CAUTION Ensure that you follow the guidelines for battery safety described in *Battery Safety Guidelines on page 8-1*.

This section describes how to set up and use a Four Slot Ethernet cradle with the MC9190-G. For cradle communication setup procedures see *Ethernet Communication Setup on page 2-12*.

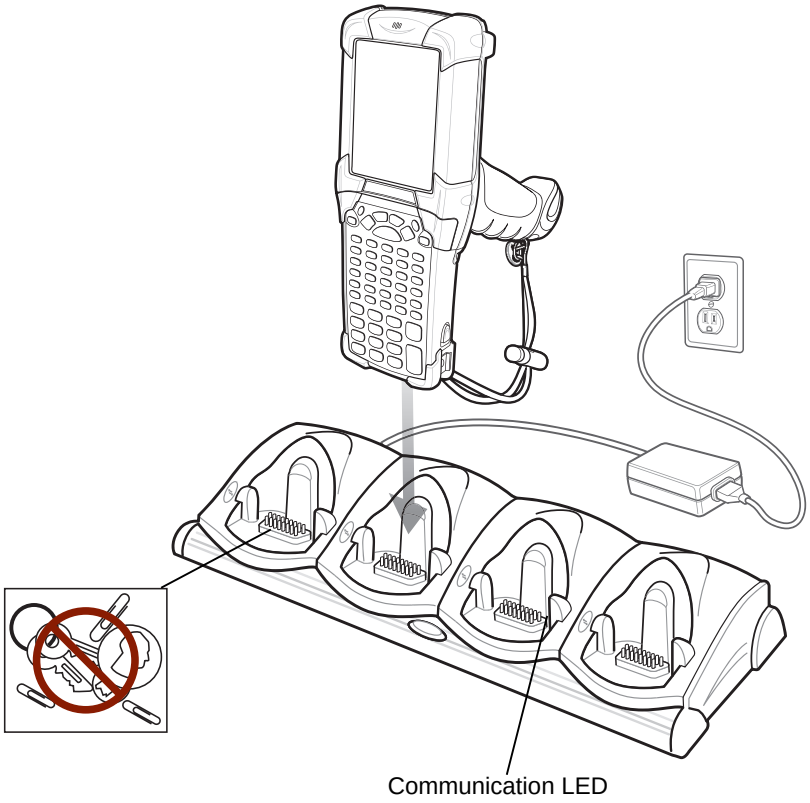


Figure 2-7 *Four Slot Ethernet Cradle*

CAUTION Do not place coins, keys or paper clips in cradle well.

The Four Slot Ethernet cradle:

- Provides 12VDC power for operating the MC9190-G.
- Enables data communication between the MC9190-G (up to four) and a host computer, over an Ethernet network (using a standard 10Base-T Ethernet cable).
- Synchronizes information between the MC9190-G and a host computer. (With customized or third party software, it can also be used to synchronize the MC9190-G with corporate databases.)
- Simultaneously charges up to four batteries in the MC9190-G.

Table 2-4 *Communication LED*

Status	Indication
Off	MC9190-G is not in cradle; MC9190-G not placed correctly; cradle is not powered.
Solid Red	MC9190-G is present, but communication has not started.
Flashing Green	MC9190-G is in the cradle, and communicating with the host computer.
Slow Flashing Red	Error, communication did not start.
Fast Flashing Red	Warning: Terminal inactivity time-out. The terminal did not finish data synchronization or had an open connection for more than 15 minutes. This time is programmable in the cradle flash parameters.
Solid Green	Terminal is present in the slot and communication is complete.
All LEDs Flashing Red	Failed automatic cradle configuration via local DHCP Service.

Setup

NOTE The Four Slot Ethernet cradle must be connected to a power source and to an Ethernet Hub (when applicable).

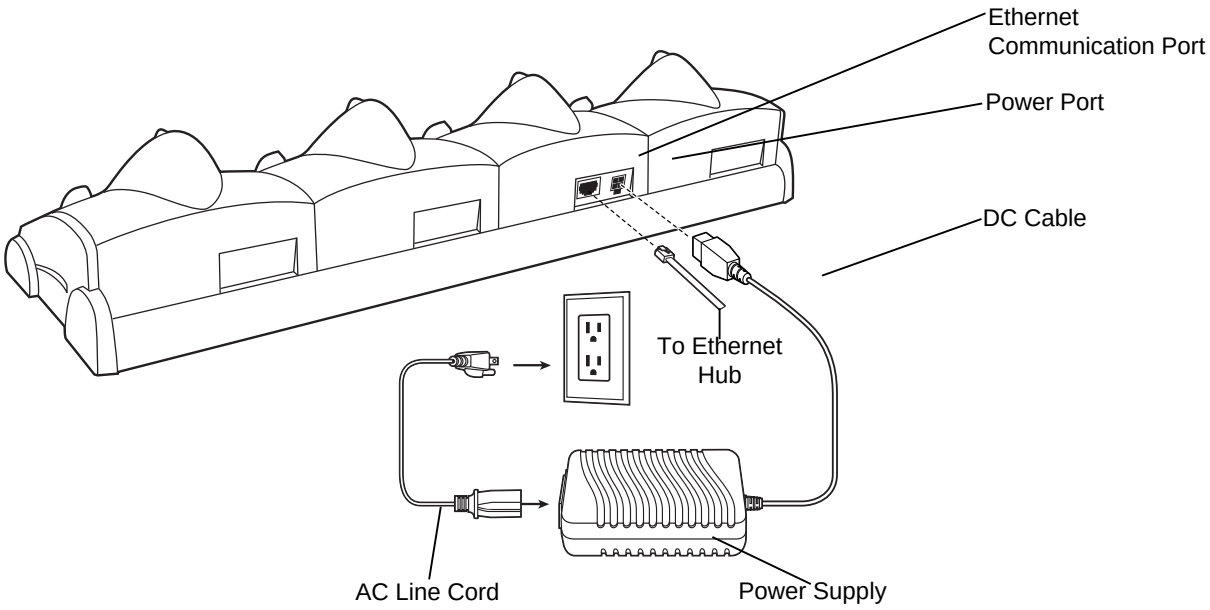


Figure 2-8 *Four Slot Ethernet Cradle Power Connection*

Battery Charging Indicators

The MC9190-G's amber charge LED, located in the Indicator LED Bar, shows the status of the battery charging in the MC9190-G. See *Table 2-2* for charging status indications. The battery usually charges in less than four hours.

Ethernet Communication Setup

To establish a connection between the MC9190-G and the host computer to communicate over an Ethernet network, perform the following:

- Install MobileDox Cradle Manager
- Install iDockIt
- Configure the MC9190-G
- Configure the host computer
- Configure the DHCP server
- Configure the cradle.

Installing MobileDox Cradle Manager

NOTE MobileDox Cradle Manager is used only when establishing a connection using the Four Slot Ethernet cradle.

The Cradle Management software features:

- View cradles that are attached to the network via MobileDox Net
- View cradle status
- Modify cradle settings including:
  - IP address settings
  - DNS and WINS settings
  - Identification settings
  - USB port specific settings
- Restart cradles connected to the network via MobileDox Net

  Update the firmware of MobileDox Net.

To install the Cradle Management Software on the host computer, download the latest version of the software from http://supportcentral.motorola.com. Refer to the instructions included with the software.

Installing iDockIt

iDockIt is a connection utility which manages activities between the MC9190-G and a connected Ethernet cradle. For more information on the utility, see the documentation provided with *iDockIt*.

iDockIt features:

- The ability to manage multiple cradle profiles. *iDockIt* auto-detects the cradle communication type and behaves accordingly.
- Integrated modem capabilities using TAPI interface.
- Runs as a tray application, and always runs in the background.
- The ability to configure settings within the application.
- Options to change parameters upon docking (with or without settings time-out).
- The ability to force synchronization events.

- The ability to disable WLAN connection on the device to ensure synchronization is performed via dock.
- Management of multiple connection types without losing settings.

To install *iDockIt* on the MC9190-G download the latest version of the *iDockIt* software from http://www.supportcentral.motorola.com to the host computer. Follow the instructions provided with the *iDockIt* software to install *iDockIt* onto the MC9190-G.

Refer to Appendix B, Using iDockIt for instructions on configuring and using iDockIt.

MC9190-G Configuration

Inserting the MC9190-G into the cradle provides direct-connect Remote Access Service (RAS) service. Configure each MC9190-G for use with the cradle, just as any remote client would be configured to connect to an Internet Service Provider (ISP). The computer comm port setting was set to USB during the iDockIt installation procedure.

DHCP Server Configuration

If you use a DHCP server to distribute IP addresses and other network parameters, the server setup should include the following:

- IP address pool (1 or 5 IP address per cradle)
- Router/gateway address
- One or more DNS server addresses
- One or more WINS server addresses
- Subnet mask.

Cradle Configuration

The MobileDox Cradle Manager allows you to setup the Device IP Address and modify cradle settings. See *Installing MobileDox Cradle Manager on page 2-12* for instructions to download and install the software. See *Figure 2-7 on page 2-10* for instructions on Four Slot Ethernet cradle connections.

Setting the Device IP Address

By default, the cradle uses DHCP to obtain its IP address. However, if DHCP fails, the Cradle Manager can assign an IP address.

NOTE This is used if the cradle is connected to the network, but fails to appear in MobileDox. Enter the hardware device (MAC) address to locate the cradle and assign it a new IP address.

To set the IP address:

1. Launch the MobileDox Cradle Manager on the host computer.
2. Click **File** > **Set IP Address of Unlisted Device**. The Set IP Address window appears:

Figure 2-9 *Set IP Address Window*

3. Enter the appropriate MAC Address and IP address.
4. Click **OK**.

Modifying Cradle Settings

1. Launch the MobileDox Cradle Manager on the host computer.
2. Select the name of the cradle you want to configure from the list.
3. Click **Device** > **Modify Settings**.
4. Use the **General Settings** tab to modify the identification settings of the cradle.

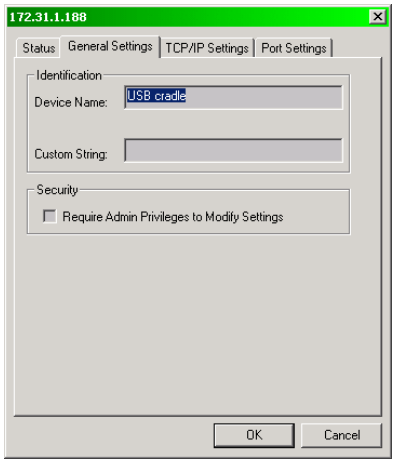


Figure 2-10 *Cradle Settings Window - General Settings Tab*

Table 2-5 *Cradle Settings - General Settings Fields*

Field	Description
Device Name	A text string used to describe the MobileDox device. Any 15-character string may be entered.
Custom String	A text string for any desired usage (examples are: location, asset ID, etc.). Any 15-character string may be entered.
Require Admin Privileges to Modify Settings check box	Selecting this check box requires users to have administrative privileges in order to modify MobileDox settings. Administrative privileges are validated using standard Windows authentication.

5. Use the **TPC/IP Settings** tab to modify the DNS and WINS identification settings of the cradle.

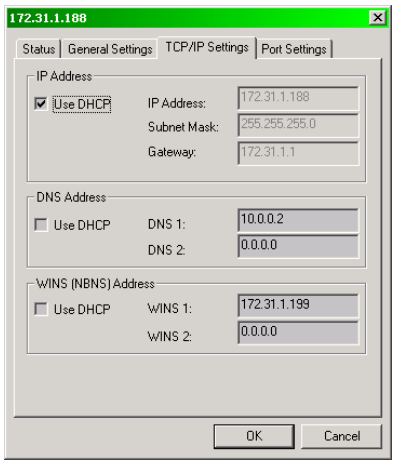


Figure 2-11 *Cradle Settings Window - TCP/IP Settings Tab*

Table 2-6 *Cradle Settings - TCP/IP Settings Fields*

Field	Description
Use DHCP	If check box is selected, necessary information is retrieved from the DHCP server. If check box is not selected, static configuration is used (information needs to be entered).
IP Address	The IP address that the MobileDox uses when communicating on the network.
Subnet Mask	The subnet mask that the MobileDox uses when communicating on the network.
Gateway Address	The IP address that the MobileDox uses to send non-local IP network data.
DNS Address	The IP address of a server(s) that can resolve Internet names into IP addresses.
WINS Address	The IP address of a server(s) that can resolve Windows network names into IP addresses. This field must be populated correctly when using ActiveSync.

6. Use the **Port Settings** tab to modify the USB port settings of the cradle.

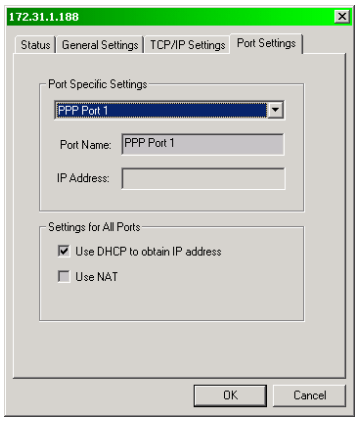


Figure 2-12 *Cradle Settings Window - Port Settings Tab*

Table 2-7 *Cradle Settings - Port Settings Fields*

Field	Description
Port Name	A text string used to describe the device attached to the port. Any 15-character string can be entered. You can specify up to four port names, one for each of the cradle's slots.
IP Address	The IP address assigned to the cradled device. There should be one IP address per cradle slot. This box is disabled for all devices if DHCP is used to obtain the IP address.
Use DHCP to obtain IP Address check box	The cradle uses DHCP to obtain an IP address for the handheld. Unchecking this selection allows the cradle to use Static IP address for the handheld.
Use NAT check box	The cradle uses Network Address Translation (NAT) when forwarding handheld traffic onto the network. No IP addresses are necessary for the handhelds. This must be disable when using ActiveSync.

7. Click **OK**.

Four Slot Charge Only Cradle

CAUTION Ensure that you follow the guidelines for battery safety described in *Battery Safety Guidelines on page 8-1*.

This section describes how to set up and use a Four Slot Charge Only cradle with the MC9190-G.

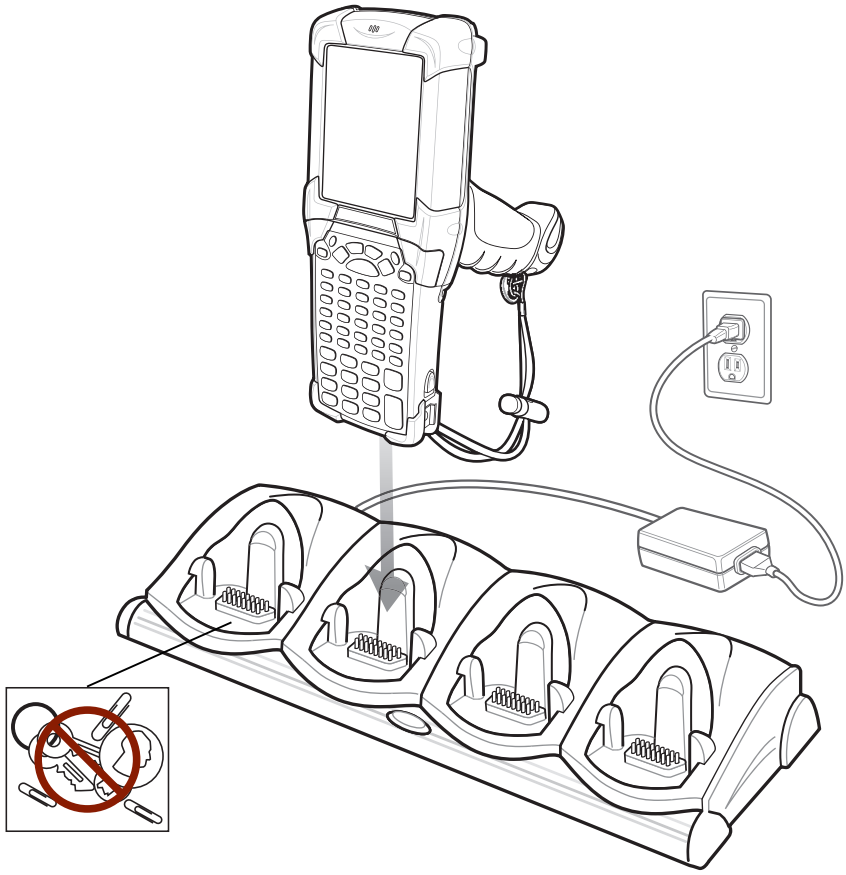


Figure 2-13 *Four Slot Charge Only Cradle*

CAUTION Do not place coins, keys or paper clips in cradle well.

The Four Slot Charge Only cradle:

- Provides 12VDC power for operating the MC9190-G.
- Simultaneously charges up to four batteries in the MC9190-G.

Setup

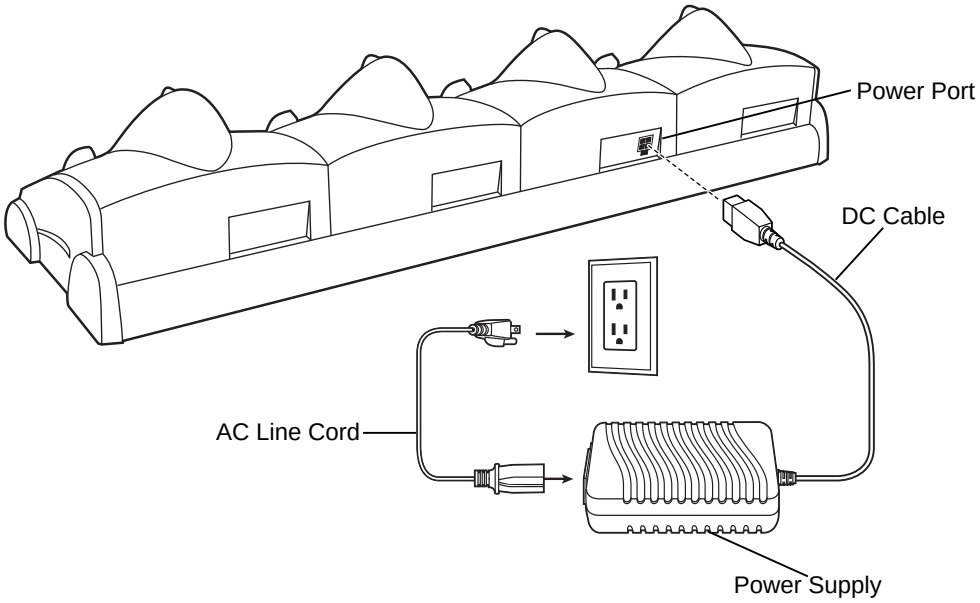


Figure 2-14 *Four Slot Charge Only Cradle Power Connection*

Battery Charging Indicators

The MC9190-G's amber charge LED, located in the Indicator LED Bar, shows the status of the battery charging in the MC9190-G. See *Table 2-2 on page 2-9* for charging status indications. The battery usually charges in less than four hours.

Four Slot Spare Battery Charger

CAUTION Ensure that you follow the guidelines for battery safety described in *Battery Safety Guidelines on page 8-1*.

This section describes how to set up and use the Four Slot Spare Battery Charger to charge up to four spare batteries.

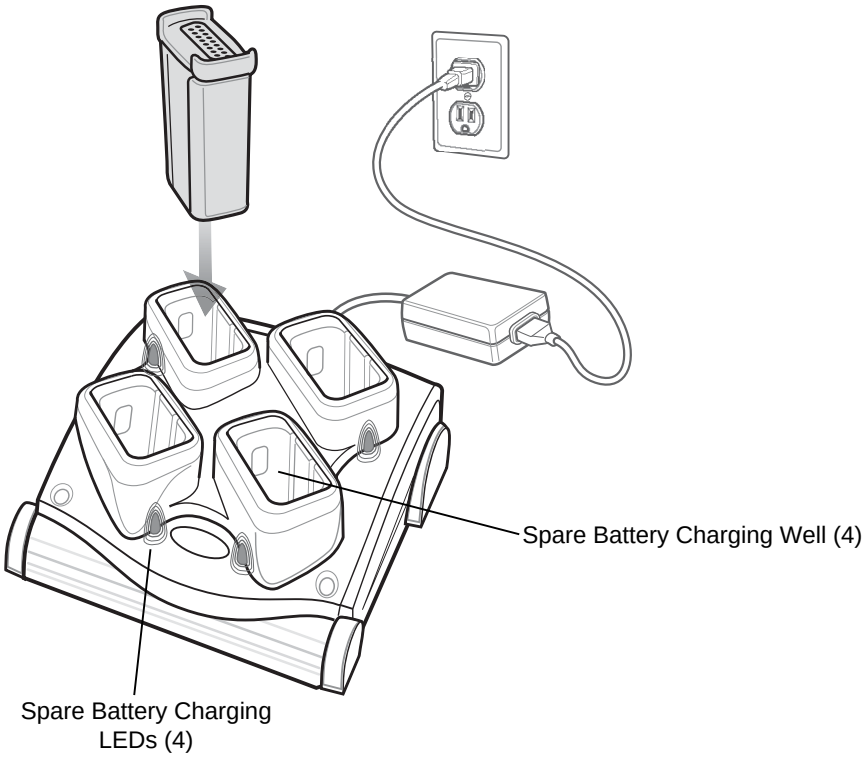


Figure 2-15 *Four Slot Spare Battery Charger*

Setup

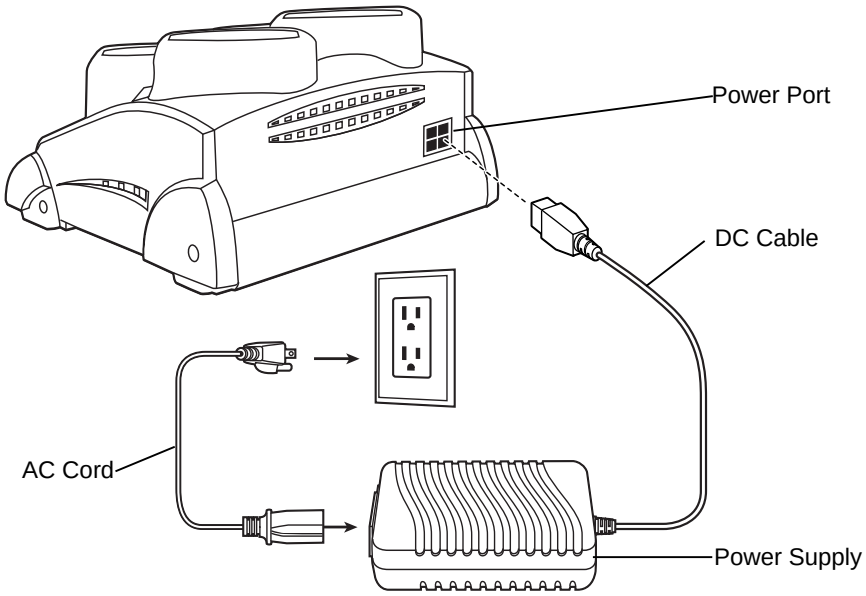


Figure 2-16 *Four Slot Spare Battery Charger Power Connection*

Spare Battery Charging with the Four Slot Spare Battery Charger

1. Connect the charger to a power source as shown in *Figure 2-16*.
2. Insert the battery into a spare battery charging slot and gently press down on the battery to ensure proper contact.

Battery Charging Indicators

An amber LED is provided on each battery charging well (see *Figure 2-15 on page 2-19*). See *Table 2-8* for charging status indications.

The battery usually charges in less than four hours.

Table 2-8 *Spare Battery LED Charging Indicators*

LED	Indication
Off	No spare battery in slot; spare battery not placed correctly; cradle is not powered.
Fast Blinking Amber	Error in charging; check placement of spare battery.
Slow Blinking Amber	Spare battery is charging.
Solid Amber	Charging complete.

Magnetic Stripe Reader

This section describes how to set up and use the snap-on MSR with the MC9190-G. The MSR snaps on to the bottom of the MC9190-G and can be easily removed when not in use.

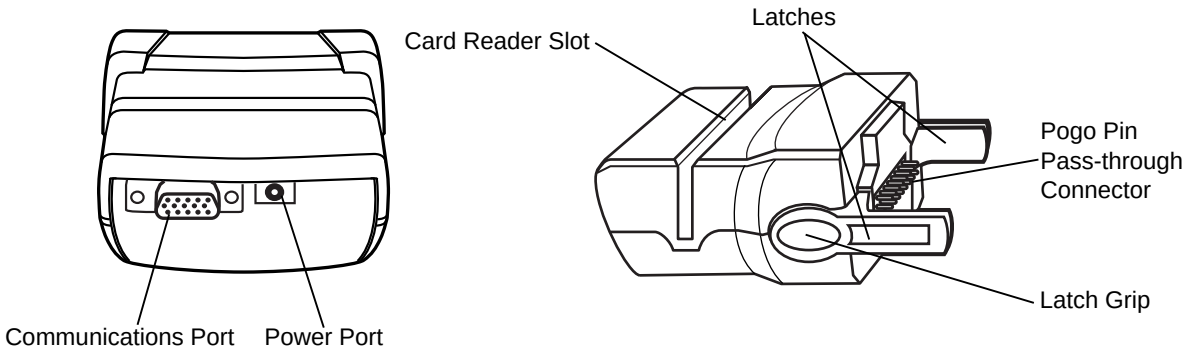


Figure 2-17 *Magnetic Stripe Reader*

When attached to the MC9190-G, the MSR:

- Provides power for operating the MC9190-G, with the appropriate power connection.
- Allows the MC9190-G to capture data from magnetic stripe cards. (To download MSR data capture software, visit: http://www.supportcentral.motorola.com).

> ***NOTE*** When a MC9190-G with Windows Mobile 6.5 is connected to a host computer through the MSR and an ActiveSync connection is made, the WLAN and WWAN radios (if applicable) are disabled. This is a Microsoft security feature to prevent connection to two networks at the same time.

- Provides serial connection through the serial pass-through port for communication with a serial device, such as a host computer. For communication setup procedures, see *Serial Communication Setup on page 2-34*.
- Provides USB connection through the USB pass-through port for communication with a USB device, such as a host computer. For communication setup procedures, see *Serial Communication Setup on page 2-34*.
- Charges the MC9190-G's battery, when used with the appropriate power supply.

Attaching and Removing

To attach, snap the MSR onto the bottom of the MC9190-G.

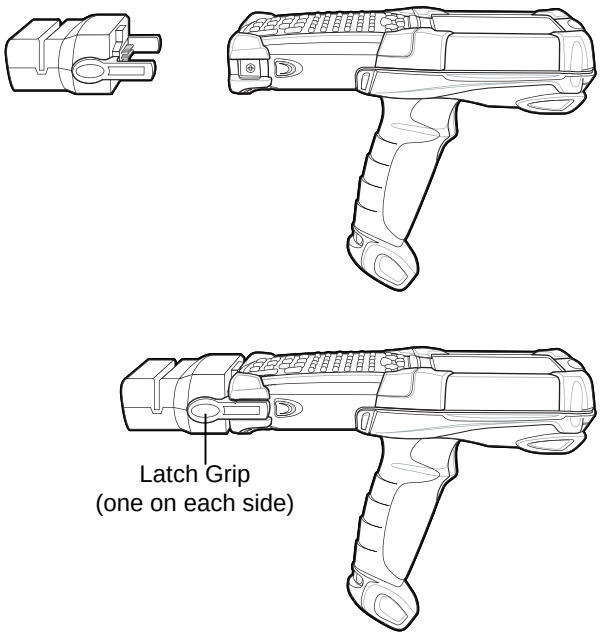


Figure 2-18 *Attaching the MSR*

To remove, squeeze the latch grips and pull the MSR from the MC9190-G.

NOTE Remove the MSR from the bottom of the MC9190-G before using a cradle for charging and communication.

Setup

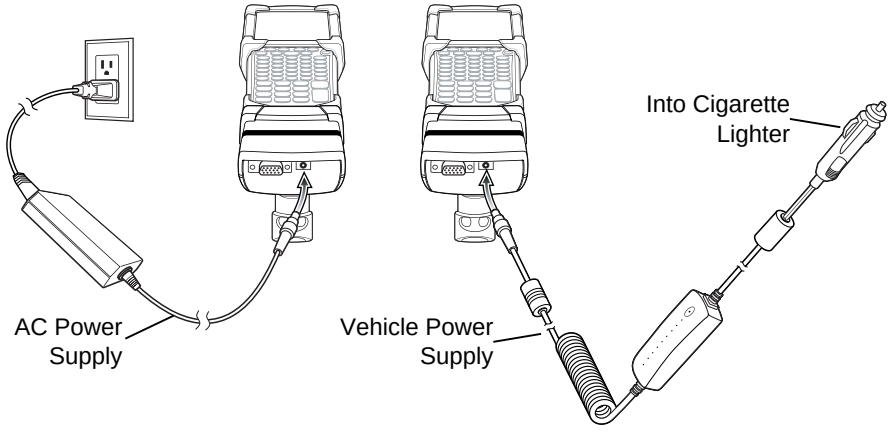


Figure 2-19 *MSR Power Connection*

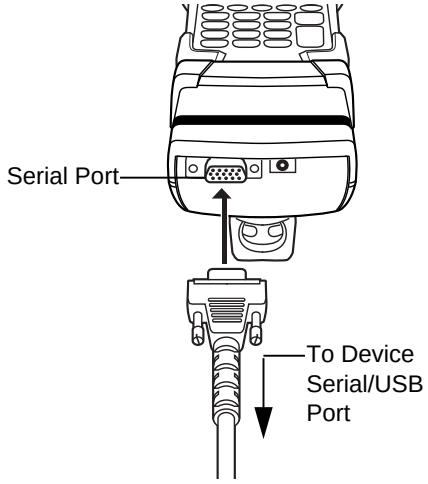


Figure 2-20 *MSR Serial/USB Connection*

Battery Charging Indicators

To charge the MC9190-G's battery through the MSR, connect the power supply to the MSR (see *Figure 2-19 on page 2-22*), then attach the MSR to the MC9190-G. The MC9190-G begins charging automatically.

NOTE Batteries must be charged within the 32° to 104° F (0° to +40° C) ambient temperature range.

The MC9190-G's amber charge LED, located in the Indicator LED Bar, shows the status of the battery charging in the MC9190-G. See *Table 2-2 on page 2-9* for charging status indications.

The battery usually charges in less than four hours, if the MC9190-G is not in use.

Serial/USB Connection

The MSR can connect to and communicate with a serial/USB device, such as a printer or host computer, through its serial port. See *Serial Communication Setup on page 2-34* for the host computer communication setup procedure.

To connect the MSR to a serial/USB device, connect one end of the serial device cable into the serial port on the MSR and the other end into the serial/USB port on the device.

Using the MSR

The *MSR9000* sample application is designed to work with the MSR. This sample application illustrates how an application should handle MSR inputs (refer to the *Symbol Application Guide for Symbol Devices*).

NOTE The MSR does not need to be attached to the power supply to read magnetic stripes.

To use the MSR:

1. Attach the MSR to the MC9190-G (see *Attaching and Removing on page 2-22*).
2. Power on the MC9190-G.

3. Tap **Start** > **9000 Demo** > **Test Apps** > **MSR 9000** or **MSR Cameo** to start the sample application.
4. Swipe the magnetic stripe card through the MSR, ensuring the magnetic stripe on the card faces the MC9190-G. The card may be swiped in either direction, from left to right or from right to left. For best results, gently press down on the card while swiping to ensure contact with the bottom of the reader.

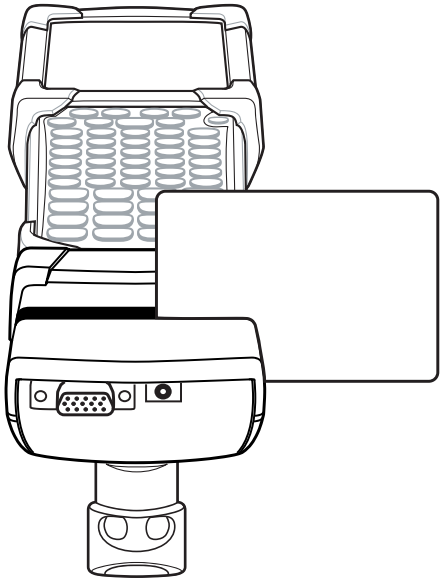


Figure 2-21 *Magnetic Stripe Card Swiping*

Cable Adapter Module

This section describes how to set up and use the snap-on CAM with the MC9190-G. The CAM snaps on to the bottom of the MC9190-G and can be easily removed when not in use.

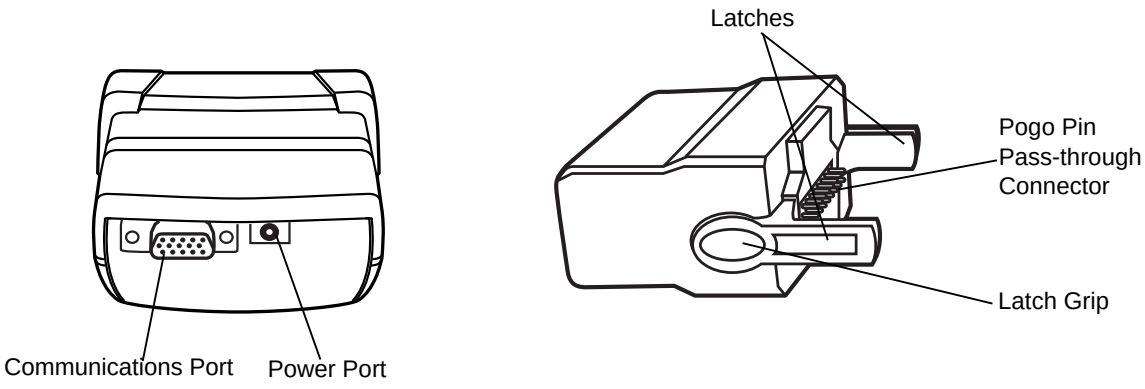


Figure 2-22 *Cable Adapter Module*

When attached to the MC9190-G, the CAM:

- Provides power for operating the MC9190-G, with the appropriate power connection.

NOTE When a MC9190-G with Windows Mobile 6.5 is connected to a host computer through the CAM and an ActiveSync connection is made, the WLAN and WWAN radios (if applicable) are disabled. This is a Microsoft security feature to prevent connection to two networks at the same time.

- Provides serial connection through the serial pass-through port for communication with a serial device, such as a host computer. For communication setup procedures, see *Serial Communication Setup on page 2-34*.
- Provides USB connection through the USB pass-through port for communication with a USB device, such as a host computer. For communication setup procedures, see *Serial Communication Setup on page 2-34*.
- Charges the MC9190-G's battery, when used with the appropriate power supply.

Attaching and Removing

To attach, snap the CAM onto the bottom of the MC9190-G.

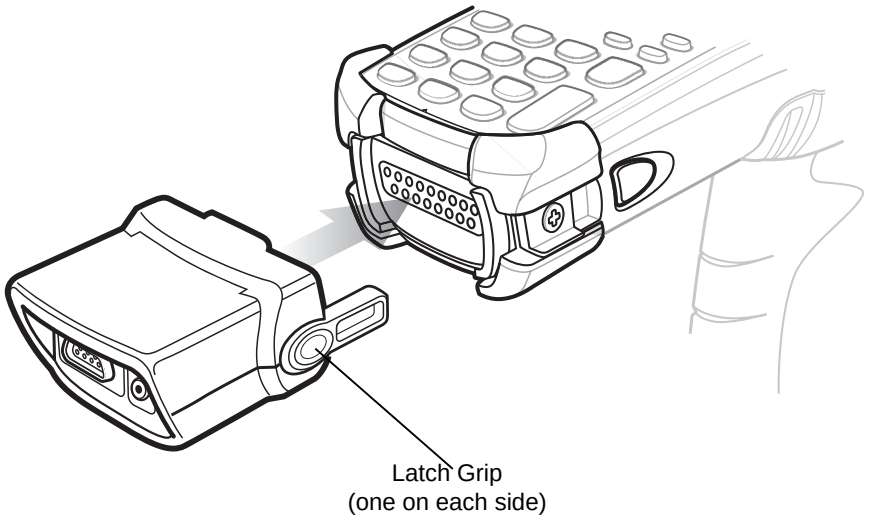


Figure 2-23 *Attaching the CAM*

To remove, squeeze the latch grips and pull the CAM from the MC9190-G.

NOTE Remove the CAM from the bottom of the MC9190-G before using a cradle for charging and communication.

Setup

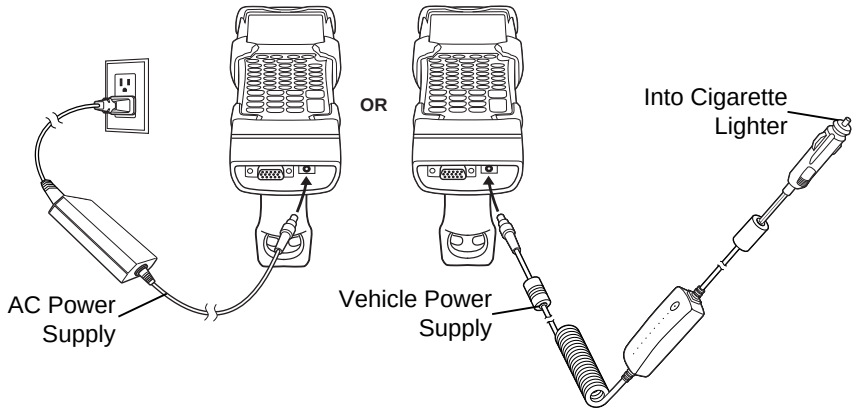


Figure 2-24 *CAM Power Connection*

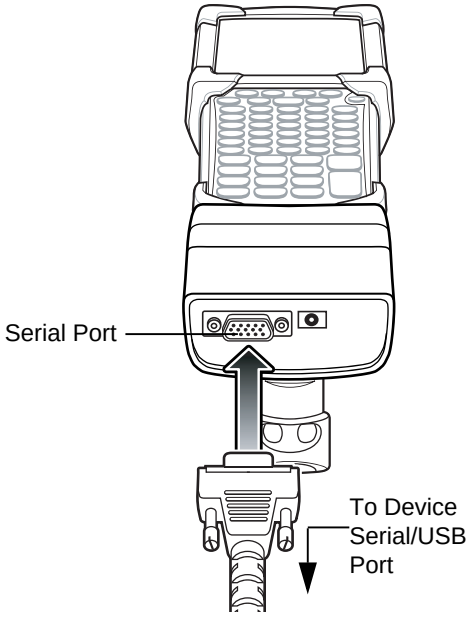


Figure 2-25 *CAM Serial Connection*

Battery Charging Indicators

To charge the MC9190-G's battery through the CAM, connect the power supply to the CAM (see *Figure 2-24 on page 2-25*), then attach the CAM to the MC9190-G. The MC9190-G begins charging automatically.

NOTE Batteries must be charged within the 32° to 104° F (0° to +40° C) ambient temperature range.

The MC9190-G's amber charge LED, located in the Indicator LED Bar, shows the status of the battery charging in the MC9190-G. See *Table 2-2 on page 2-9* for charging status indications. The battery usually charges in less than four hours, if the MC9190-G is not in use.

Serial/USB Connection

The CAM can connect to and communicate with a serial/USB device, such as a printer or host computer, through its serial port. See *Serial Communication Setup on page 2-34* for the host computer communication setup procedure.

To connect the CAM to a serial/USB device, connect one end of the serial device cable into the serial port on the CAM and the other end into the serial/USB port on the device.

Universal Battery Charger (UBC) Adapter

CAUTION Ensure that you follow the guidelines for battery safety described in *Battery Safety Guidelines on page 8-1*.

This section describes how to use the UBC adapter to charge a spare battery.

The UBC can be used with a power supply as a standalone spare battery charger or it can be used with the four station UBC2000 to provide charging to simultaneously charge up to four spare batteries. For additional information about the UBC2000, see the *UBC 2000 Universal Battery Charger Product Guide* (p/n 70-33188-xx)

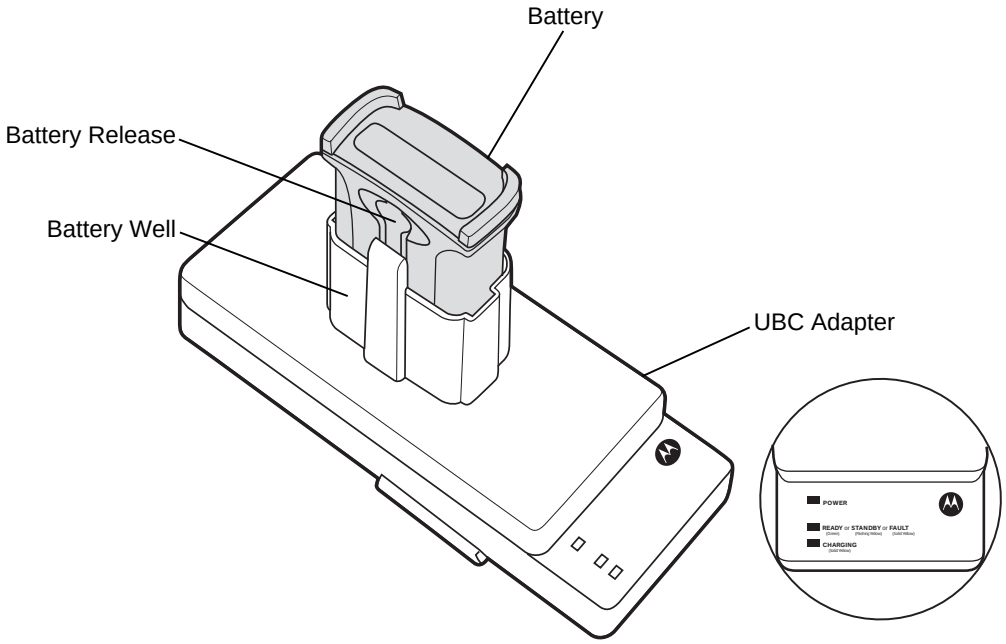


Figure 2-26 *UBC Adapter*

Inserting and Removing a Battery

Insert the battery into the battery well with the charging contacts facing down (over charging pins) and gently press down on the battery to ensure proper contact.

To remove the battery, press the battery release and lift battery out of the well.

Setup

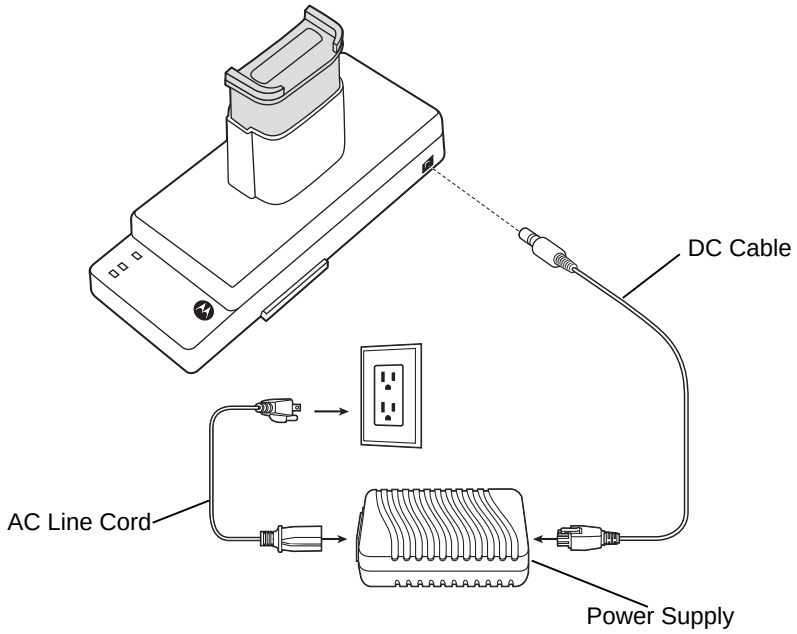


Figure 2-27 *UBC Adapter Power Connection*

Battery Charging Indicators

To charge a spare battery using the UBC adapter, connect the power supply to the UBC (see *Figure 2-27 on page 2-28*), then insert the spare battery. The spare battery begins charging automatically. The UBC's charge LEDs (see *Figure 2-28*)) show the status of the battery charging in the adapter. *Table 2-9* shows battery charging status indications. The battery usually charges in three hours.

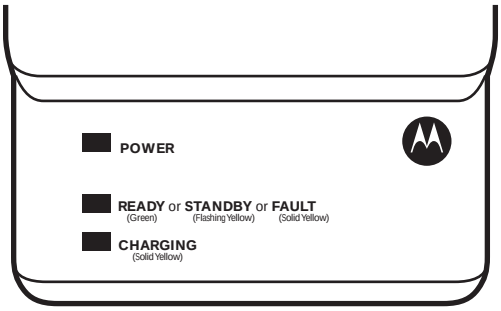


Figure 2-28 *UBC Adapter LEDs*

Table 2-9 *UBC Adapter Charge LED Status Indications*

LED	Indication	Description
POWER	Green	Power is connected to the UBC Adapter.
READY or	Green	Charging complete.

Table 2-9 *UBC Adapter Charge LED Status Indications (Continued)*

LED	Indication	Description
STANDBY or	Flashing-Yellow	The battery was deeply discharged and is being trickle charged to bring the voltage up to the operating level. After operating level voltage is achieved the battery charges normally.
FAULT	Yellow	Charging error, check placement of MC9190-G and spare battery.
CHARGING	Yellow	Normal charge.

Modem Module

This section describes how to setup and use the MDM9000 Modem Module.

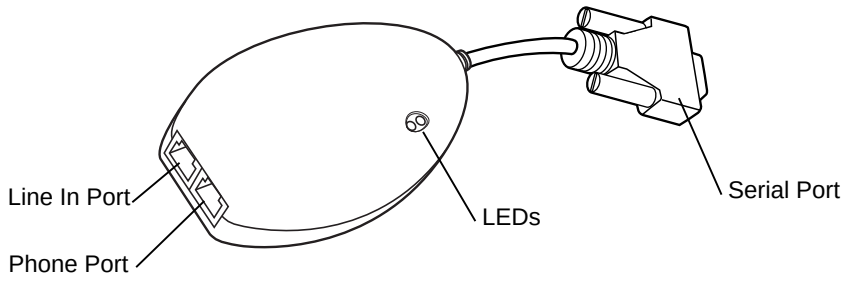


Figure 2-29 *Modem Module*

The Modem Module enables data communication between the MC9190-G and a host computer, remotely through the phone lines, and synchronizes information between the MC9190-G and a host computer.

The following items are required for a modem connection:

- Telephone number, IP address and DNS/WINS address information from the dial-in server administrator
- Dial-in account on the host system, including a user ID and password
- RJ11 or RJ12 modem cable
- Functioning telephone jack that supports plug-in modems connected to the local telephone system

  Setup of Country Codes to use the modem with the appropriate country's telephone network.

The following items are required for communication:

- MC9190-G
- Cable Adapter Module (CAM), Motorola p/n ADP9000-100R (see *Cable Adapter Module on page 2-24*)
- Serial Adapter Cable (for communication via cradle), p/n 25-63856-01R
- Microsoft ActiveSync
- Setup of host computer and MC9190-G.

Setup

Connecting to the MC9190-G

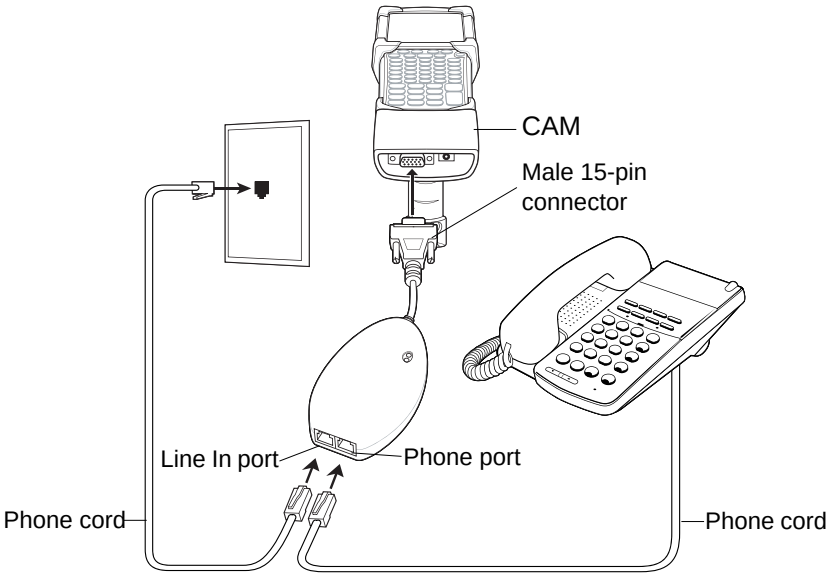


Figure 2-30 *Modem Module Connection - MC9190-G*

CAUTION Do not connect the modem's 15-pin connector into a VGA port of a host computer.

Using the Correct Telephone Line Type

Use a standard analog phone line, as in most households. In an office, use a line connected to a fax machine or modem. In a hotel, request a room with a standard phone line or data port. If necessary, check with the local phone company or administrator to make sure you are using the right type of line before sending data.

Connecting to the Single Slot Serial/USB Cradle

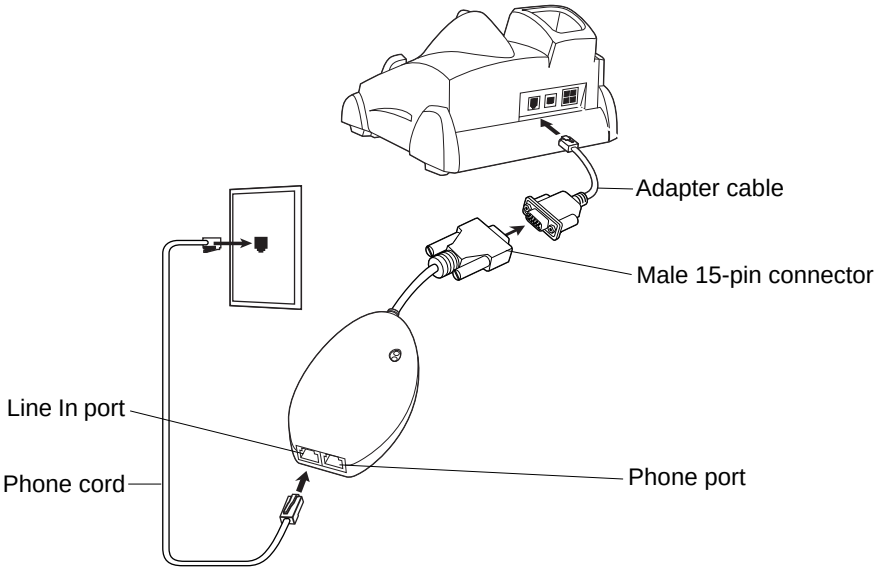


Figure 2-31 *Modem Module Connection - Single Slot Serial/USB Cradle*

CAUTION Do not connect the modem's 15-pin connector into a VGA port of a host computer.

NOTE If using a phone, connect the cord from the phone to the Phone port on the modem.

Table 2-10 *Modem Indicators*

LED	Indication
Off	Modem is not properly connected to the MC9190-G; modem is not receiving power.
Green	Modem is connected to the MC9190-G and is receiving power.
Solid Amber	MC9190-G is communicating with the host computer.

Configuring the MC9190-G for the Modem (Windows Mobile 6.5)

To create a new modem connection on the MC9190-G:

1. Connect the modem to the MC9190-G as described in *Connecting to the MC9190-G on page 2-30*.
2. Tap **Start** > **Settings** > **Connections** > **Connections**.
3. In the **Task** tab, select **Add a new modem connection** to create a connection.

NOTE Depending on the location when dialing, additional numbers may need to be dialed (e.g., a 9 prefix is often required if dialing from work; a country code is needed if dialing internationally). To avoid creating new modem connections for each situation, tap **use dialing rules** to define frequently used dialing locations.

4. Enter a name for the connection. In the drop-down menu, select **Hayes Compatible on COM1**, then tap **Next**.

5. Enter the access phone number in the **My Connection** window and tap **Next**.
6. If necessary, enter the user name, password and domain.
7. Tap **Advanced...** to set TCP/IP and server information, if required.
8. Tap **OK** to exit the **Advanced** window.
9. Tap **Finish**.

Configuring the MC9190-G for the Modem (Windows CE 6.0)

To create a modem connection on the MC9190-G:

1. Connect the modem to the MC9190-G, see *Connecting to the MC9190-G on page 2-30*.
2. On the MC9190-G, tap **Settings** > **Control Panel**. Double-tap the **Network and Dial-up Connections** icon.
3. In the **Connection** window, double-tap **Make New Connection** to create a connection.
4. Enter a name for the connection on the **Make New Connection** window, then tap **Next**.
5. In the **Select a modem** list, select **Hayes Compatible on COM1**, then tap **Next**.

> ***NOTE*** Depending on the location when dialing, additional numbers may need to be dialed (e.g., a 9 prefix is often required if dialing from work; a country code is needed if dialing internationally). To avoid creating new modem connections for each situation, tap *use dialing rules* to define frequently used dialing locations.

6. In the **Phone Number** window, enter the phone number for the connection, then tap **Finish**.

Connecting the Modem (Windows Mobile 6.5)

To start the connection:

1. Tap **Start** > **Settings** > **Connections** tab > **Connections**.
2. In the **Connections** window, tap **Manage existing connections**.
3. Tap and hold the connection name, then select **Connect** from the pop-up menu. The modem attempts to connect.

Connecting the Modem (Windows CE 6.0)

To connect to the host computer using the modem connection created in the last section:

1. Tap **Start** > **Settings** > **Control Panel** > **Network and Dialup Connections**.
2. In the **Connection** window, double-tap the name of the connection created in Creating a *Connecting the Modem (Windows CE 6.0) on page 2-32*.
3. To modify dial-up properties, tap **Dial Properties...**, make the selections in the **Device Properties** window, then tap **OK**.
4. Tap **Connect**. The modem attempts to connect.

Changing the Initialization String (Windows CE 6.0)

To enter AT commands:

1. On the MC9190-G, tap **Settings** >**Control Panel**. Double-tap the **Network and Dial-up Connections** icon.
2. In the **Connection** window, double-tap the **My Connection** icon to edit the settings.

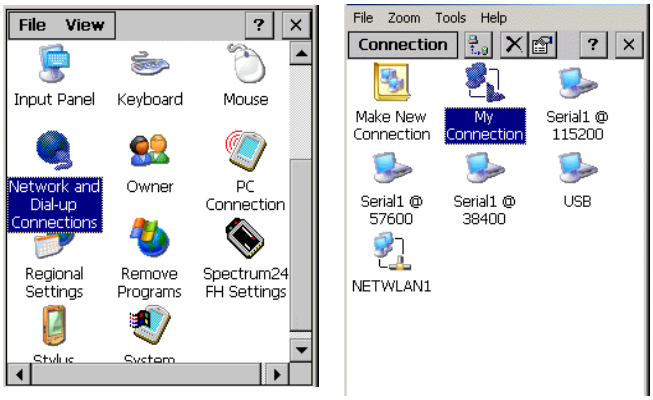


Figure 2-32 *Network and Connections Windows*

3. To modify dial-up properties, tap **Dial Properties**, make the selections in the **Device Properties** window.
4. To edit the **Dialing Patterns**, tap **Edit**.

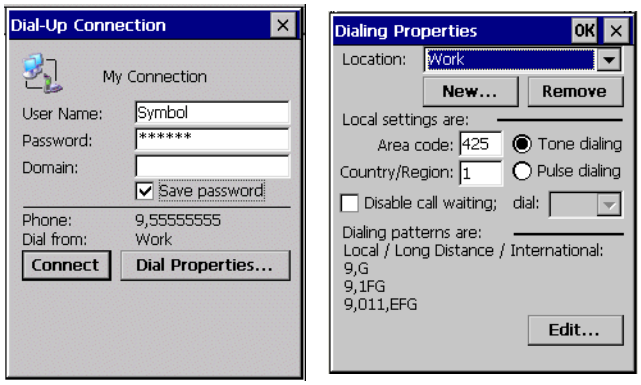


Figure 2-33 *Dial-Up and Dial Properties Window*

5. The **Edit Dialing Patterns** window appears.

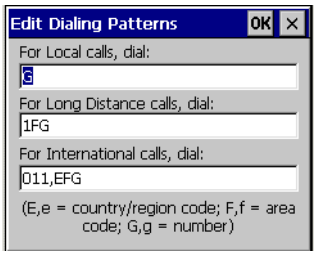


Figure 2-34 *Edit Dialing Patterns Window*

6. Edit the dialing properties.
7. Tap **OK** to exit the **Edit Dialing Patterns** window.
8. Tap **OK** to exit the **Dialing Patterns** window.
9. Tap **Connect** at the Dial-Up Connection window. The modem attempts to connect.

Serial Communication Setup

The serial communications setup can be used to set up to communicate with a Single Slot Serial/USB Cradle, MSR or a CAM.

NOTE For serial communication using accessories that can communicate with either a serial or USB connection, connect only the serial cable. Do not connect both the serial and USB cables. If both serial and USB communication cables are required, the host computer's USB port must be disabled in ActiveSync before serial communication can be enabled.

Setting Up a Connection on the MC9190-G (Windows Mobile 6.5)

1. On the MC9190-G tap **Start** > **ActiveSync**.
2. Tap **Menu** > **Connections**.
3. Select the **Synchronize all PCs using this connection** check box.
4. Select the connection (e.g., Bluetooth or USB) for synchronization from the drop-down list. The default connection for synchronization is **USB**.
5. Tap **OK**.
6. Ensure that synchronization software is installed on the host computer and a partnership was created.
7. Select **Start** > **All Programs** > **Microsoft ActiveSync** or **Windows Mobile Device Center** on the host computer, if it is not already running.

NOTE Every MC9190-G should have a unique device name. Never try to synchronize more than one MC9190-G to the same name.

8. In the synchronization window, select **File** > **Connection Settings**.

Figure 2-35 *Connection Settings Window*

9. In the **Connection Settings** window, select the appropriate check box for the type of connection being used. If using a serial connection, select the COM port from the drop-down list.

NOTE If serial, USB and Ethernet communication connections are used, all check boxes can be selected to avoid having to update this window for different connections.

10. Tap **OK** to save any changes made.

11. Ensure the accessory being used to communicate is connected to the host computer and the appropriate power source.

> ***NOTE*** The accessory requires a dedicated port. It cannot share a port with any other device. Refer to the host computer user manual supplied to locate the USB ports.

12. Connect the MC9190-G to the accessory being used for communication.
13. Power on the MC9190-G.
14. If a partnership was already created between the host computer and MC9190-G, synchronization occurs automatically upon connection.

Serial Connection Setup (Windows CE 6.0)

1. On the MC9190-G tap **Start** > **Settings** > **Control Panel** > **PC Connection** icon.
2. Tap **Change Connection...** .
3. Select the serial communication type from the drop-down list.
4. Tap **OK**.
5. Tap **OK**.
6. Ensure that synchronization software was installed on the host computer and a partnership was created.
7. Start **ActiveSync** or **Windows Mobile Device Center** if it is not running on the host computer. To start, select **Start** > **Programs** > **Microsoft ActiveSync**.

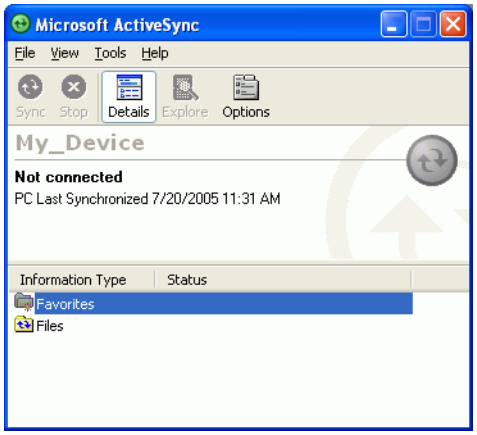


Figure 2-36 *ActiveSync - Not Connected*

8. In the **ActiveSync** window, select **File** > **Connection Settings**. The **Connection Settings** window displays.

Figure 2-37 *Connection Settings*

9. For a serial connection, select **Allow connections to one of the following:** check box and select the comm port from the drop-down list.
10. For USB connection, select **Allow USB connection** check box.
11. Tap **OK** to save any changes made.

> ***NOTE*** Every MC9190-G should have a unique device name. Never try to synchronize more than one MC9190-G to the same name.

12. Connect the device to the host computer.

> ***NOTE*** The cradle requires a dedicated port. It cannot share a port with an internal modem or other device. Refer to the computer user manual supplied to locate the serial port(s).

13. Upon connection, synchronization occurs automatically.

USB Host Communication Setup

NOTE USB Host mode is only available on Windows Mobile devices.

The MC9190-G can be configured as a USB host device for use with USB client devices.

To configure the MC9190-G as a USB host:

1. Tap **Start** > **Settings** > **System** > **USBConfig**.
2. Tap the **USB Host Mode** radio button.
3. Tap **OK**.

NOTE When the MC9190-G is configured a a USB host, it cannot ActiveSync with a host computer.

To configure the MC9190-G as a USB client:

1. Tap **Start** > **Settings** > **System** > **USBConfig** icon.
2. Tap the **USB Client Mode** radio button.
3. Tap **OK**.
4. Remove the MC9190-G from the cradle or CAM.
5. Re-insert the MC9190-G into a cradle or re-connect the CAM.

Wall Mounting Bracket and Shelf Slide

This section describes how to install and set up the MC9000 Wall Mount Bracket and Shelf Slide to mount cradles to a wall.

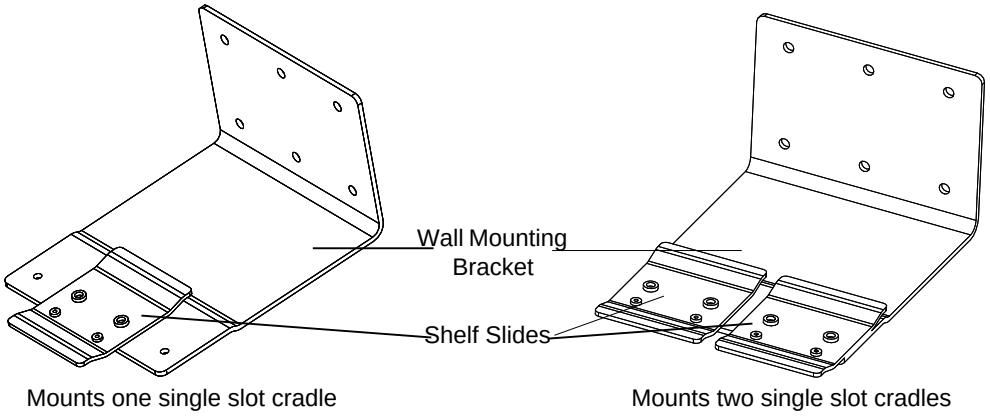


Figure 2-38 *Wall Mounting Bracket with Shelf Slide*

When installed on a wall, the mounting bracket and shelf slide enable mounting one or two single slot cradles to a wall. Use two brackets to mount a four slot cradle.

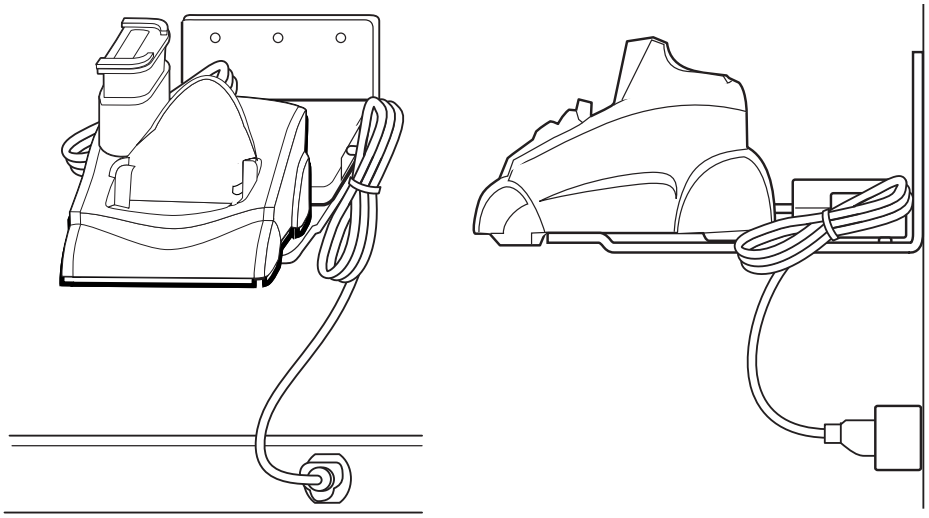


Figure 2-39 *Mounted Single Slot Cradle With Power Connection*

Installing the Wall Mount Bracket

To install the wall mount bracket for use with one or two single slot cradles or four slot chargers, place the smaller surface of the bracket against the wall or vertical support structure, and secure with four 1/4” screws (use two of the three screw holes in each row).

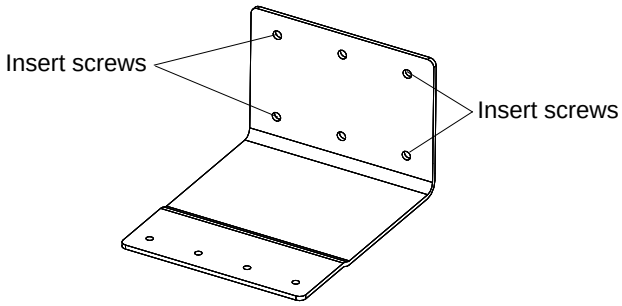


Figure 2-40 *Wall Mounting Bracket Mounting Screws*

If using the bracket and slide with a four slot cradle, secure a second bracket to the wall next to the first, aligning the horizontal screw holes on the second with those of the first.

Attaching the Shelf Slide to the Wall Mount Bracket

One Single Slot Cradle/Four Slot Battery Charger

To attach the shelf slide to the wall mount bracket for use with one single slot cradle or four slot battery charger:

1. Place the slide on the bracket, aligning the larger pan-head screw holes in the slide with the center two screw holes on the bracket.
2. Secure the slide to the bracket by inserting the two pan-head screws provided from below the bracket, up through the bracket's screw holes and then through the slide's pan-head screw holes.

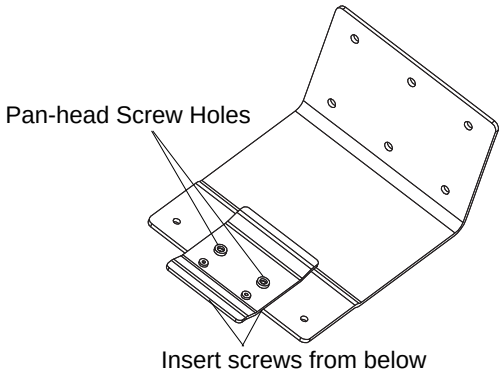


Figure 2-41 *Attaching One Shelf Slide*

Two Single Slot Cradles/Four Slot Battery Chargers

To attach the shelf slide to the wall mount bracket for use with two single slot cradles or two four slot battery chargers:

1. Place the slide on the bracket, aligning the larger pan-head screw holes in the slide with the left or right two screw holes on the bracket.
2. Secure the slide to the bracket by inserting the two pan-head screws provided from below the bracket, up through the bracket's screw holes and then through the slide's pan-head screw holes.
3. Secure a second slide to the remaining two screw holes on the bracket in the same manner.

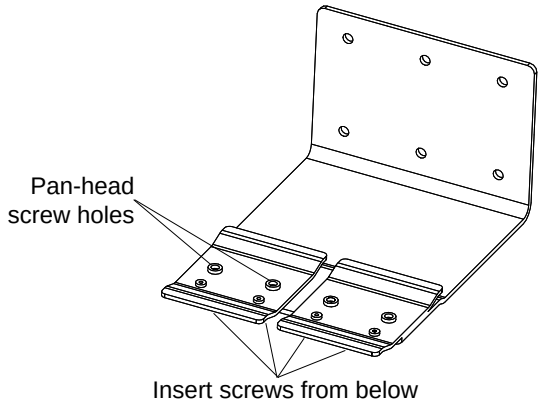


Figure 2-42 *Attaching Two Shelf Slides*

Four Slot Cradle

To attach the shelf slide to the wall mount bracket for use with a four slot cradle:

1. Place a slide on the left-hand bracket, aligning the larger pan-head screw holes in the slide with the left two screw holes on the bracket.
2. Secure the slide to the bracket by inserting the two pan-head screws provided from below the bracket, up through the bracket's screw holes and then through the slide's pan-head screw holes.
3. Place a slide on the right-hand bracket, aligning the larger pan-head screw holes in the slide with the right two screw holes on the bracket.
4. Secure the second slide to the bracket as described in Step 2.

Installing the Cradle/Charger on the Bracket

Install the cradle or charger onto the bracket, inserting the bracket's slide into the grooves on the bottom of the cradle/charger and sliding the cradle/charger into the desired position.

For one single slot cradle/four slot charger, center it on the bracket.

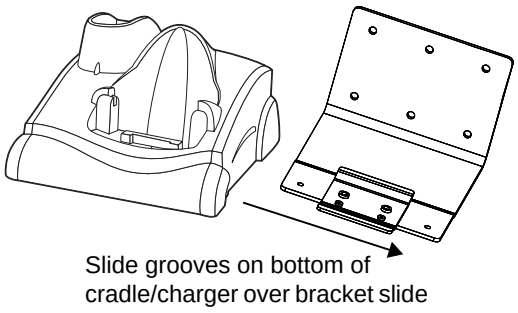


Figure 2-43 *Attaching Two Shelf Slides*

For two single slot cradle/four slot chargers, slide one onto the left-hand slide, and one onto the right-hand slide.

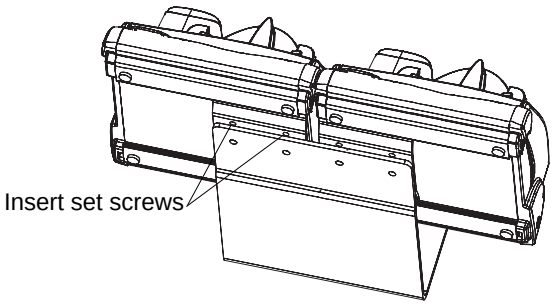


Figure 2-44 *Attaching Two Shelf Slides*

For a four slot cradle, slide the cradle on to the slides, across both brackets.

Secure each cradle or charger to its slide using the two set screws provided.

Chapter 3 Synchronization

Introduction

Synchronization lets the user manage information between an MC9190-G and a host computer so that changes made either on the MC9190-G or on the host computer appear in both places. Download and install sync software to the host computer (either Microsoft ActiveSync for Windows XP or Windows Mobile Device Center (WMDC) for Windows Vista and Windows 7) in order to use the sync feature. Visit www.microsoft.com on the host computer for details.

NOTE When the MC9190-G is connected to a host computer and a sync connection is made, the Wi-Fi radio is disabled. This is a Microsoft security feature to prevent connection to two networks at the same time.

The sync software:

- Allows working with MC9190-G-compatible applications on the host computer. The sync software replicates data from the MC9190-G to view, enter, and modify data on the host computer.
- Synchronizes files between the MC9190-G and the host computer, converting the files to the correct format.
- Backs up the data stored on the MC9190-G. Synchronization is a one-step procedure that ensures the data is always safe and up-to-date.
- Copies (rather than synchronizes) files between the MC9190-G and the host computer.
- Controls when synchronization occurs by selecting a synchronization mode. For example, synchronize continuously while the MC9190-G is connected to the host computer, or synchronize only on command.
- Selects the types of information to synchronize and control how much data is synchronized.

Installing the Sync Software

To download and install either Microsoft ActiveSync (for Windows XP) or WMDC (for Windows Vista and Windows 7), visit www.microsoft.com and follow the instructions for the host computer.

MC9190-G Setup

NOTE Microsoft recommends installing the sync software on the host computer before connecting the MC9190-G.

The MC9190-G can be set up to communicate with a USB connection. The MC9190-G communication settings must be set to match the communication settings used with ActiveSync or WMDC.

On Window CE 6.0 devices:

1. On the MC9190-G tap **Start** > **Settings** > **Control Panel** > **PC Connection**. The **PC Connection Properties** window appears.

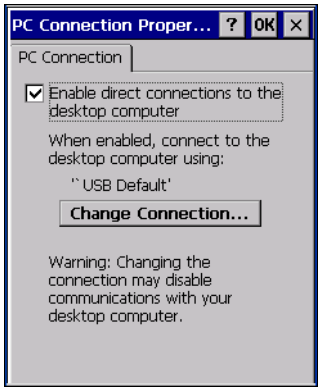


Figure 3-1 *PC Connection Properties Window*

2. Tap the **Change Connection** button.
3. Select the connection type from the drop-down list.
4. Tap **OK** to exit the **Change Connection** window and tap **OK** to exit the **PC Connection Properties** window.
5. Proceed with installing ActiveSync or WMDC on the host computer and setting up a partnership.

On Windows Mobile 6.5 Devices:

1. On the MC9190-G tap **Start** > **Programs** > **ActiveSync** icon. The **ActiveSync** window appears.
2. Tap **Menu** > **Connections**.
3. Select the connection type from the drop-down list.
4. Tap **OK** to exit the **Connections** window and tap **OK** to exit the **ActiveSync** window.
5. Proceed with installing ActiveSync or WMDC on the host computer and setting up a partnership.

Setting Up a Sync Connection

ActiveSync

1. Select **Start** > **Programs** > **Microsoft ActiveSync** on the host computer. The **ActiveSync Window** displays.

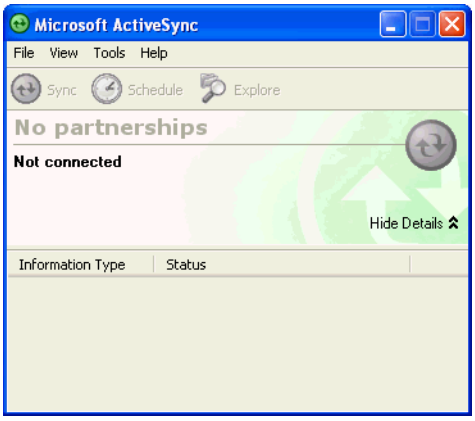


Figure 3-2 *ActiveSync Window*

NOTE Assign each MC9190-G a unique device name. Do not try to synchronize more than one MC9190-G to the same name.

2. In the **ActiveSync** window, select **File** > **Connection Settings**. The **Connection Settings** window appears.

Figure 3-3 *Connection Settings Window*

3. Select **Allow USB connections** check box.
4. Select the **Show status icon in taskbar** check box.
5. Select **OK** to save any changes made.

Windows Mobile Device Center

1. Select **Start** > **All Programs** > **Windows Mobile Device Center** on the host computer.

Figure 3-4 *Windows Mobile Device Center Window*

2. In the WMDC window, under **Mobile Device Settings**, click **Connection** settings.

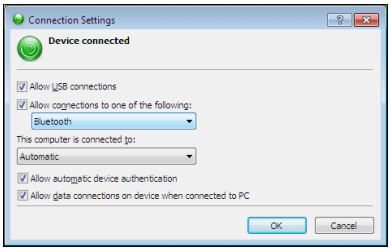


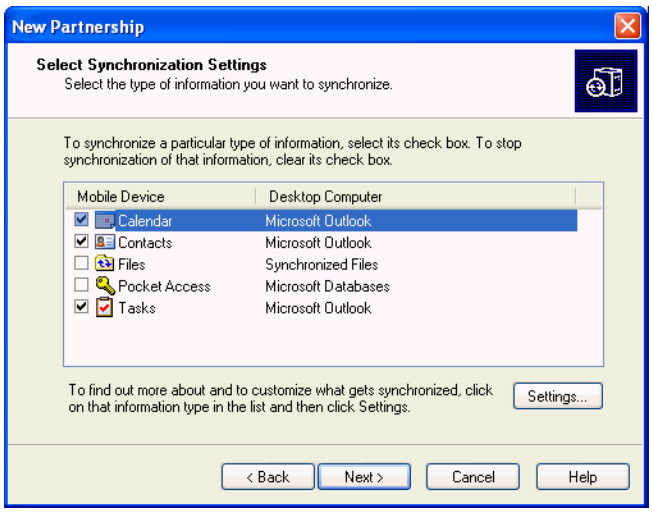
Figure 3-5 *Connection Settings Window*

3. Select **Allow USB connections and adjust any additional settings as needed**.
4. Click **OK** to save your settings.

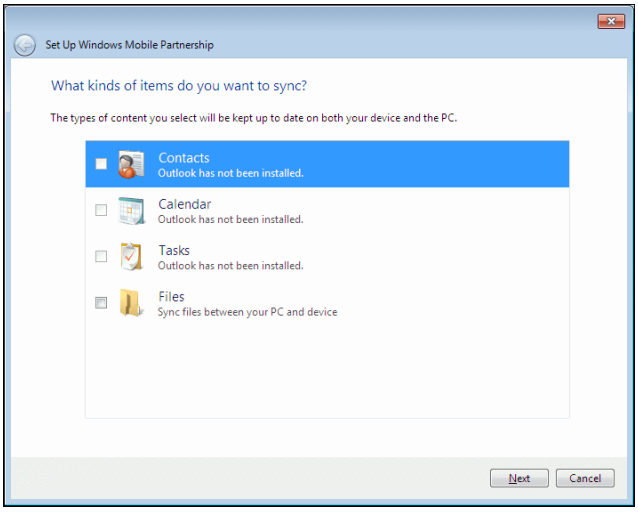
Setting up a Partnership with a Windows CE 6.0 Device

To set up a partnership with a Windows CE 6.0 device:

1. If the **Get Connected** window does not appear on the host computer, select **Start** > **All Programs** > **Microsoft ActiveSync**.
2. Select if you want to create synchronize with the host computer or to connect as a guest.
3. Click **Next**.



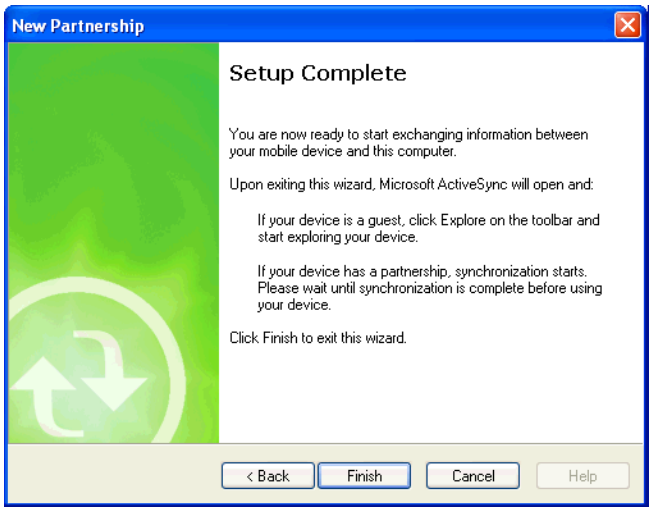
ActiveSync



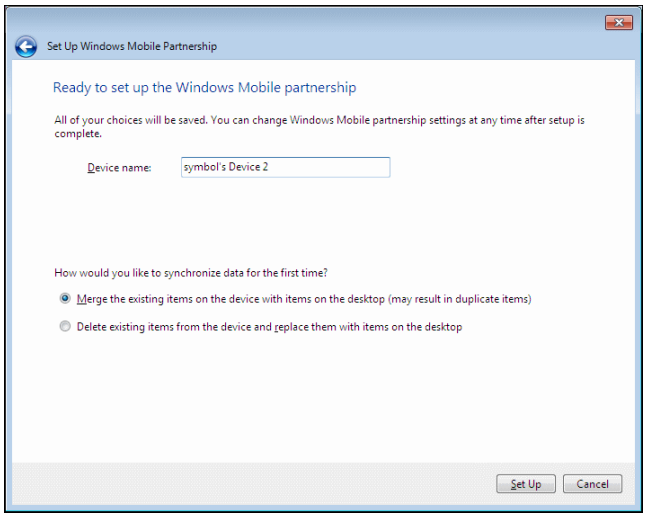
WMDC

Figure 3-6 *Select Synchronization Setting Window*

4. Select the appropriate settings and click **Next**.



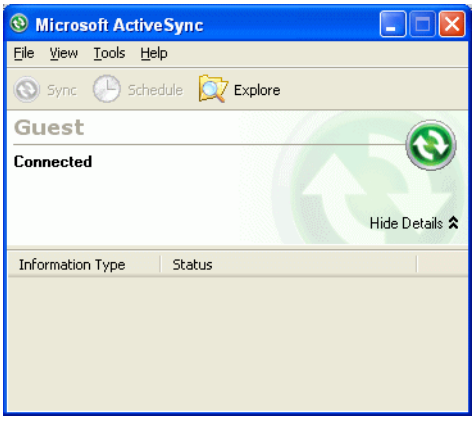
ActiveSync



WMDC

Figure 3-7 *Setup Complete Window*

5. Click **Finish** or **Setup**.



ActiveSync

WMDC

Figure 3-8 *Connected Window*

During the first synchronization, information stored on the MC9190-G is copied to the host computer. When the copy is complete and all data is synchronized, the MC9190-G can be disconnect from the host computer.

NOTE The first synchronization operation must be performed with a local direct connection. To retain partnerships after a cold boot, capture partnership registry information in a .reg file and save it in the Flash File System, detailed information is provided in the EMDK Windows CE Help File for the Motorola MC9190-G.

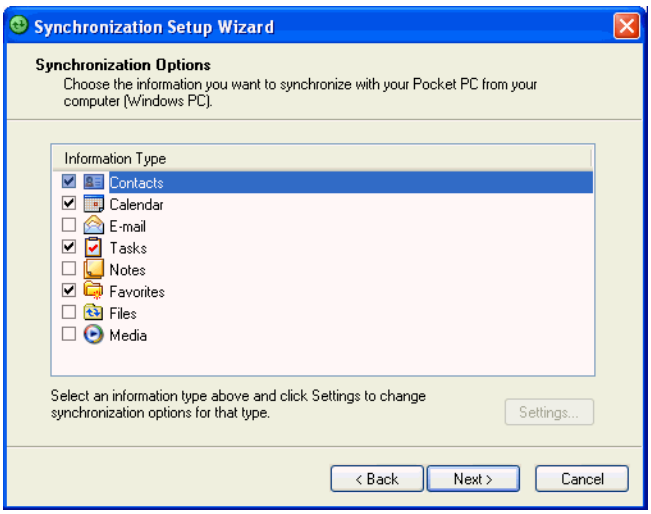
For more information about using ActiveSync or WMDC, start the application on the host computer, then see Help.

Synchronization With a Windows Mobile 6.5 Device

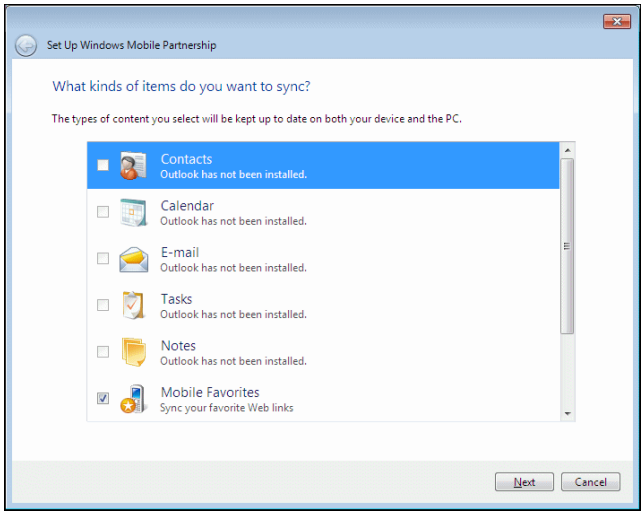
NOTE When the MC9190-G is connected to your computer and a sync connection is made, the Wi-Fi radio (if applicable) is disabled. This is a Microsoft security feature to prevent connection to two networks at the same time.

To synchronize with the MC9190-G:

1. Connect the MC9190-G to your computer using the provided USB cable.
2. If the **Get Connected** window does not appear on your computer, select **Start** > **All Programs** > **Microsoft ActiveSync** or **Windows Mobile Device Center**.
3. Click **Next**.
4. Select the check box to synchronize with a server running Microsoft Exchange if applicable.
5. Click **Next**.



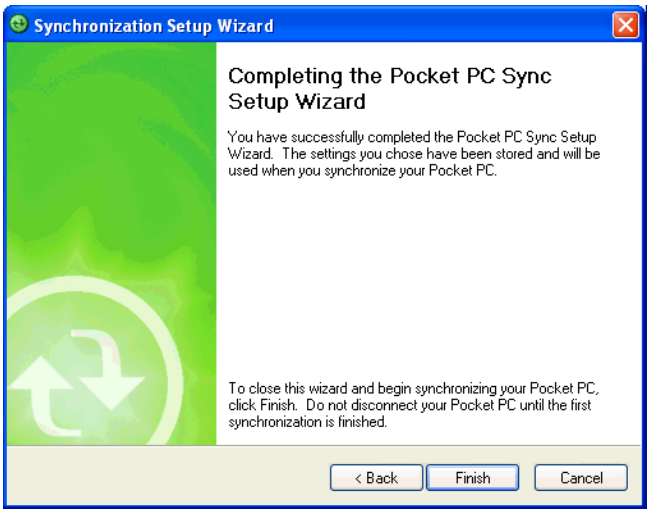
ActiveSync



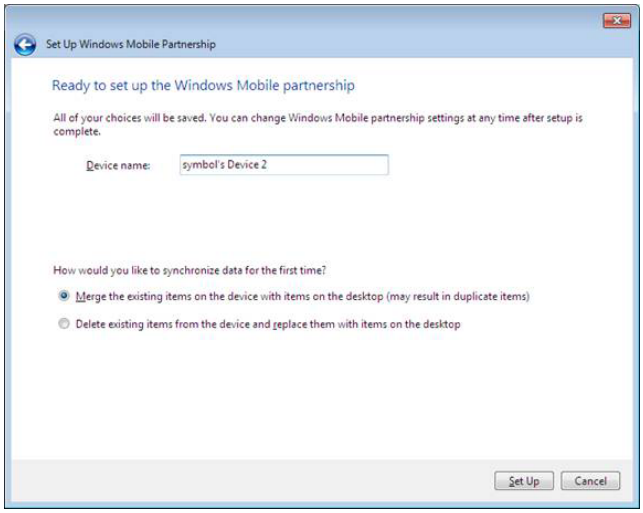
WMDC

Figure 3-9 *Select Synchronization Settings*

6. Select the appropriate settings and click **Next**.



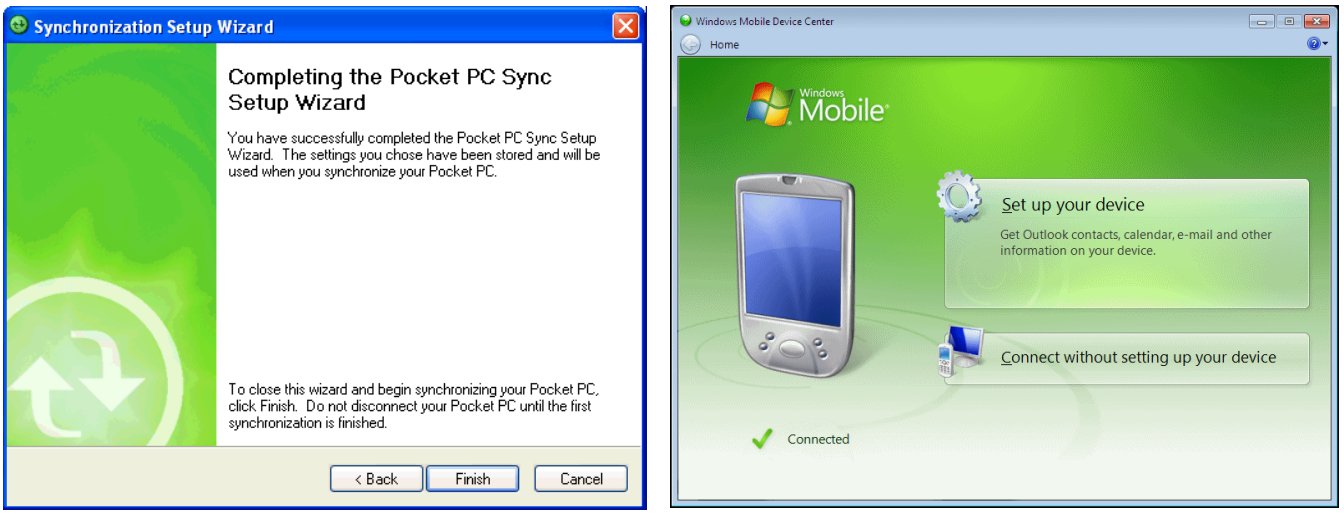
ActiveSync



WMDC

Figure 3-10 *Setup Complete Window*

7. Click **Finish**.



ActiveSync WMDC

Figure 3-11 *Connected Window*

During the first synchronization, information stored on the MC9190-G is copied to the host computer. When the copy is complete and all data is synchronized, the MC9190-G can be disconnected from the host computer.

NOTE The first synchronization operation must be performed with a local direct connection. Windows Mobile retains partnerships information after a cold boot.

Chapter 4 Wireless Applications

Introduction

Wireless Local Area Networks (LANs) allow the MC9190-G to communicate wirelessly and send captured data to a host device in real time. Before using the MC9190-G on a WLAN, the facility must be set up with the required hardware to run the wireless LAN and the MC9190-G must be configured. Refer to the documentation provided with the access points (APs) for instructions on setting up the hardware.

NOTE 802.11d is enabled by default. When enabled, the AP must be configured the same in order to connect.

To configure the MC9190-G, a set of wireless applications provide the tools to configure and test the wireless radio in the MC9190-G. Refer to the *Wireless Fusion Enterprise Mobility Suite User Guide for Version 3.00* for information on configuring wireless profiles. Go to http://supportcentral.motorola.com for the latest version of this guide. See *Software Versions on page xiv* to determine the Fusion version on the MC9190-G.

Windows CE Devices

Tap the **Signal Strength** icon to display the **Wireless Launcher** menu.

NOTE On devices with Windows Mobile, access the Wireless launcher from the Home screen. Select the Fusion plug-in and then tap the **Fusion Menu** button.

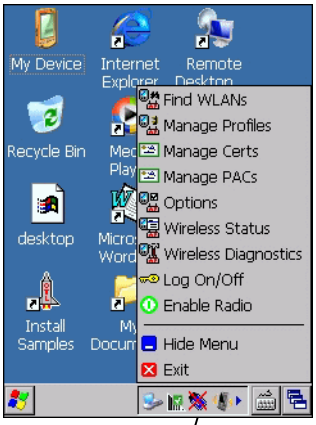


Figure 4-1 *Wireless Application Menu*

Windows Mobile 6.5 Devices

The interface to the **Signal Strength** icon and **Wireless Launcher** has changed in the Windows Mobile 6.5 default Today screen. To view the **Wireless Launcher**, select the Fusion plug-in on the Today screen and tap the **Fusion Menu** soft key.

Figure 4-2 *Fusion Plug-in on Today Screen*

Functionality of this dialog is similar to the **Wireless Launch** menu. Drag the window up and down to view all menu items. Tap the icon next to the item to open it.

Figure 4-3 *Wireless Launcher Window*

Fusion Applications

Many of the items in the menu invoke one of the Fusion applications. These menu items and their corresponding applications are summarized below:

- Find WLANs – Invokes the Find WLANs application which displays a list of the WLANs active in your area.The **Wireless Application** menu on the task tray provides the following wireless applications:
- Manage Profiles – Invokes the Manage Profiles application (which includes the Profile Editor Wizard) to manage and edit your list of WLAN profiles.
- Manage Certs – Invokes the Certificate Manager application which allows you to manage certificates used for authentication.
- Manage PACs – Invokes the PAC Manager application which helps you manage the list of Protected Access Credentials used with EAP-FAST authentication.
- Options – Invokes the Options application which allows you to configure the Fusion option settings.
- Wireless Status – Invokes the Wireless Status application which allows you to view the status of the current wireless connection.
- Wireless Diagnostics – Invokes the Wireless Diagnostics application which provides tools with which to diagnose problems with the wireless connection.
- Log On/Off – Invokes the Network Login dialog which allows you to log on to a particular profile or to log off from the currently active profile.

Additional Wireless Launcher menu entries include:

- Enable/Disable Radio
- Hide Menu
- Exit.

Signal Strength Icon

The **Signal Strength** icon in the task tray indicates the MC9190-G's wireless signal strength as follows:

Table 4-1 *Signal Strength Icons Descriptions*

Icon	Status	Description
	Excellent signal strength	WLAN network is ready to use.
	Very good signal strength	WLAN network is ready to use.
	Good signal strength	WLAN network is ready to use.
	Fair signal strength	WLAN network is ready to use. Notify the network administrator that the signal strength is only “Fair”.
	Poor signal strength	WLAN network is ready to use. Performance may not be optimum. Notify the network administrator that the signal strength is “Poor”.
	Out-of-network range (not associated)	No WLAN network connection. Notify the network administrator.
	The WLAN radio is disabled.	The WLAN radio is disabled. To enable, choose **Enable Radio** from the **Wireless Applications** menu.
None	The Wireless Launcher application was exited.	The **Wireless Launcher** application has been closed. See the Fusion Functions paragraphs below for how to restart the **Wireless Launcher**.

Turning Off the Radio

On Device with Windows CE

To turn off the WLAN radio tap the **Signal Strength** icon on the task tray and select **Disable Radio**. A red X appears across the icon indicating that the radio is disabled (off).

Figure 4-4 *Wireless Connection Status Icon*

To turn the radio back on, tap the **Signal Strength** icon on the task tray and select **Enable Radio**. The red X disappears from the icon indicating that the radio is enabled (on).

On Device with Windows Mobile

Windows Mobile 6.5 devices include **Wireless Manager**, which provides a simple method of enabling, disabling the WLAN radio.

To open **Wireless Manager**, tap the Status bar and select the **Connectivity** icon.

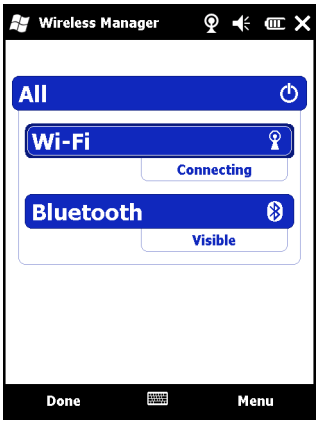


Figure 4-5 *Opening Wireless Manager*

Select **Wireless Manager**.

To enable or disable the WLAN radio, tap the **Wi-Fi** bar.

Chapter 5 Application Deployment for Windows CE

Introduction

This chapter describes new features in Windows CE 6.0 including how to package applications, and procedures for deploying applications onto the MC9190-G.

Packaging

Packaging combines an application's executable files into a single file, called a package. This makes it easier to deploy and install an application to the MC9190-G. Package new applications and updates, such as new DLL files, as CAB files, then deploy them to the MC9190-G. Refer to the *Microsoft Windows Mobile 6 Help* file for information on CAB files.

Software Installation on Development PC

To develop applications to run on the MC9190-G, use one or both of the following:

- Enterprise Mobility Developer Kit (EMDK) for C
- Platform Software Developer Kit (Platform SDK) for MC9190-G

The EMDK for C is a development tool used to create native C and C++ applications for the Motorola MC9190-G. It includes documentation, header files (.H), and library files (.LIB) for native code application development that targets Motorola value-add APIs.

The *Windows CE Platform SDK for MC9100c60* is used in conjunction with the EMDK for C to create Windows CE applications for the MC9190-G. The Platform SDK installs a new Windows CE device type and its associated libraries onto the development PC.

The software requirements to use the EMDK for C are:

- Microsoft Windows XP 32-bit Edition or Microsoft Windows Vista 32-bit Edition
- Microsoft ActiveSync 4.5 or higher. (only for Windows XP, Windows Vista has its own Mobile Device Center)

- If developing applications for Windows Mobile 6.5 or Windows CE 6.0
  - Microsoft® Visual Studio 2005
  - Microsoft® Visual Studio 2005 Service Pack1

  (or)
  - Microsoft® Visual Studio 2008
  - Microsoft® Visual Studio 2008 Service Pack1
- One or more of the following Platform SDK's:
  - Windows Mobile 6 Professional and Standard Software Development Kits Refresh
- For Windows CE embedded development use the Motorola Platform SDK (PSDK) for your specific device. The PSDK can be found on the device download page at http://supportcentral.motorola.com.

Platform SDK

NOTE Platform SDK is only required for Window CE 6.0 devices.

To download and install the appropriate Platform SDK:

1. Download the appropriate Platform SDK from the Support Central web site, http://supportcentral.motorola.com.
   a. Select *MC9190-G*. The *MC9190-G Product* page displays.
   b. On the *MC9190-G Product* page, select the appropriate *Platform SDK for MC*9190 from the *Software Downloads* section. The *Platform SDK* page displays.
   c. Save the .exe file to the development computer.
2. Run the file and follow the screen prompts to install.

EMDK for C

To download and install the EMDK for C:

1. Download the EMDK from the Support Central web site, http://supportcentral.motorola.com.
   a. Select *MC9190-G*. The *MC9190-G Product* page displays.
   b. On the *MC9190-G Product* page, select the appropriate *Enterprise Mobility Developer Kit for C* from the *Software Downloads* section. The *Enterprise Mobility Developer Kit for C* page displays.
   c. Select the latest version, and save the .exe file to the development computer.
2. Locate the .exe file on the development computer, double-click the executable file and follow the install screen prompts.
3. Once installed, access the components of the EMDK for C from the *Enterprise Mobility Developer Kit for C* program group of the *Windows Start* menu.
4. The sample applications provide examples of how to interface with the Motorola API functions. To build a sample application, open the Samples folder from the Windows *Start* menu. Open the folder for the desired sample and then open the project file. The project file has an extension of VCP. Microsoft Visual C++ v4.0 automatically launches. Select *WinCE* as the Active WCE Configuration. Select Win32 (WCE ARMV4) Debug as the active configuration.

NOTE If both Microsoft Visual C++ v3.0 and Microsoft Visual C++ v4.0 are installed on the development computer, ensure Microsoft Visual C++ v4.0 launches.

Installing Other Development Software

Developing applications for the MC9190-G may require installing other development software, such as application development environments, on the development PC. Follow the installation instructions provided with the software.

Software Updates

Download updates to the EMDK for C from the Support Central web site at: http://supportcentral.motorola.com. Check this site periodically for important updates and new software versions.

Windows CE Flash Storage

In addition to the RAM-based storage standard on Windows CE, the MC9190-G is also equipped with a non-volatile Flash-based storage area which can store data (partitions) that can not be corrupted by a cold boot. This Flash area is divided into two categories: Flash File System (FFS) Partitions and Non-FFS Partitions.

FFS Partitions

The MC9190-G includes two FFS partitions. These partitions appear to the MC9190-G as a hard drive that the OS file system can write files to and read files from. Data is retained even if power is removed.

The two FFS partitions appear as two separate folders in the Windows CE file system and are as follows:

- Platform: The Platform FFS partition contains Motorola-supplied programs and Dynamic Link Libraries (DLLs). This FFS is configured to include DLLs that control system operation. Since these drivers are required for basic MC9190-G operation, only experienced users should modify the content of this partition.
- Application: The Application FFS partition is used to store application programs needed to operate the MC9190-G.

Working with FFS Partitions

Because the FFS partitions appear as folders under the Windows CE file system, they can be written to and read like any other folder. For example, an application program can write data to a file located in the Application folder just as it would to the Windows folder. However, the file in the Application folder is in non-volatile storage and is not lost on a cold boot (e.g., when power is removed for a long period of time).

Standard tools such as ActiveSync can be used to copy files to and from the FFS partitions. They appear as the “Application” and “Platform” folders to the ActiveSync explorer. This is useful when installing applications on the MC9190-G. Applications stored in the Application folder are retained even when the MC9190-G is cold booted, just as the Sample Applications program is retained in memory.

There are two device drivers included in the Windows CE image to assist developers in configuring the MC9190-G following a cold boot: RegMerge and CopyFiles.

RegMerge.dll

RegMerge.dll is a built-in driver that allows registry edits to be made to the Windows CE registry. Regmerge.dll runs very early in the boot process and looks for registry files (.reg files) in certain Flash File System folders during a cold boot. It then merges the registry changes into the system registry located in RAM.

Since the registry is re-created on every cold boot from the default ROM image, the RegMerge driver is necessary to make registry modifications persistent over cold boots.

RegMerge is configured to look in the root of two specific folders for .reg files in the following order:

\Platform

\Application

Regmerge continues to look for .reg files in these folders until all folders are checked. This allows folders later in the list to override folders earlier in the list. This way, it is possible to override Registry changes made by the Platforms partitions folders. Take care when using Regmerge to make registry changes.

NOTE Regmerge only merges the .reg files on cold boots. The merge process is skipped during a warm boot.

Making modifications to registry values for drivers loaded before RegMerge is not recommended. However, these values may require modification during software development. Since these early loading drivers read these keys before RegMerge gets a chance to change them, the MC9190-G must be cold booted. The warm boot does not re-initialize the registry and the early loading driver reads the new registry values.

Do not use Regmerge to modify built-in driver registry values, or merge the same registry value to two files in the same folder, as the results are undefined.

CopyFiles

Windows CE expects certain files to be in the Windows folder, residing in volatile storage. Windows CE maintains the System Registry in volatile storage. CopyFiles copies files from one folder to another on a cold boot. Files can be copied from a non-volatile partition (Application or Platform) to the Windows or other volatile partition during a cold boot. During a cold boot CopyFiles looks for files with a .CPY extension in the root of the Platform and Application FFS partitions (Platform first and then Application). These files are text files containing the source and destination for the desired files to be copied separated by “>”.

Files are copied to the Windows folder from the Flash File System using copy files (*.cpy) in the following order:

\Platform

\Application

Example:

\Application\ScanSamp2.exe>\Windows\ScanSamp2.exe

This line directs CopyFiles to copy the ScanSamp2.exe application from the \Application folder to the \Windows folder.

Non-FFS Partitions

Non-FFS partitions include additional software and data pre-loaded on the MC9190-G that can be upgraded. Unlike FFS Partitions, these partitions are not visible when the operating system is running. They also contain system information. Non-FFS partitions include the following:

- Windows CE: The complete Windows CE operating system is stored on Flash devices. If necessary, the entire OS image may be downloaded to the MC9190-G using files provided by Motorola. Any upgrades must be obtained from Motorola. This partition is mandatory for the MC9190-G.
- Splash Screen: a bitmap smaller than 16 Kb (and limited to 16 bits per pixel) is displayed as the MC9190-G cold boots. To download a customized screen to display, see *Creating a Splash Screen on page 5-16*.
- Bootloader: This program interfaces with the host computer and allows downloading via USB cable any or all of the partitions listed above, as well as updated versions of Bootloader. Use caution downloading updated Bootloader versions; incorrect downloading of a Bootloader causes permanent damage to the MC9190-G. Bootloader is mandatory for the MC9190-G.
- Partition Table: Identifies where each partition is loaded in the MC9190-G.

Downloading Partitions to the MC9190-G

USBDownload is used to specify a hex destination file for each partition and download each file to the MC9190-G. This download requires a program loader stored on the MC9190-G. The MC9190-G comes with a program loading utility, Bootloader, stored in the MC9190-G's write-protected flash.

Bootloader

Bootloader allows the user to upgrade the MC9190-G with software updates and/or feature enhancements.

Partition Update vs. File Update

There are two types of updates supported by the MC9190-G: partitions and files. The file system used by the MC9190-G is the same as the file system used on a desktop computer. A file is a unit of data that can be accessed using a file name and a location in the file system. When a file is replaced, only the contents of the previous file are erased. The operating system must be running for a file to be updated, so the Bootloader cannot perform individual file updates as it is a stand-alone program that does not require the operating system to be running.

A typical partition is a group of files, combined into a single “partition” that represents a specific area of storage. Examples of partitions are the flash file systems such as Platform or Application. (Using the desktop computer comparison, these partitions are roughly equivalent to a C: or D: hard disk drive.) In addition to the “hard disk” partitions, some partitions are used for single items such as the operating system, monitor, or splash screen. (Again using a desktop computer comparison, these partitions are roughly the equivalent of the BIOS or special hidden system files.) When a partition is updated, all data that was previously in its storage region is erased - i.e. it is not a merge but rather a replacement operation. Typically, the operating system is not running when partitions are update, so Bootloader can perform partition updates.

All partition images suitable for use by Bootloader are in hex file format for transfer by USBDownloader from the development computer to the MC9190-G.

Upgrade Requirements

Upgrade requirements:

- The hex files to be downloaded (on development computer)
- A connection from the host computer and the MC9190-G
- USBDownload (on development computer) to download the files.

Once these requirements are satisfied, the MC9190-G can be upgraded by invoking Bootloader and navigating the menus. See *Bootloader on page 5-9* for procedures on downloading a hex file to the MC9190-G.

Deployment

This section provides information about installing software and files on the MC9190-G.

Software deployment can be performed by:

- Copying files from a host computer
- Installing programs
- Updating images.

Copying Files from a Host Computer

To copy files from a host computer to the MC9190-G:

1. Ensure that ActiveSync or Windows Mobile Device Center is installed on the host computer and that a partnership was created. For more information see, *Chapter 3, Synchronization*.
2. Connect the MC9190-G to the host computer using a Single Slot Serial/USB cradle or an appropriate cable. See, *Chapter 2, Accessories* for connection information.
3. On the host computer, select **Start** > **Programs** > **ActiveSync**.

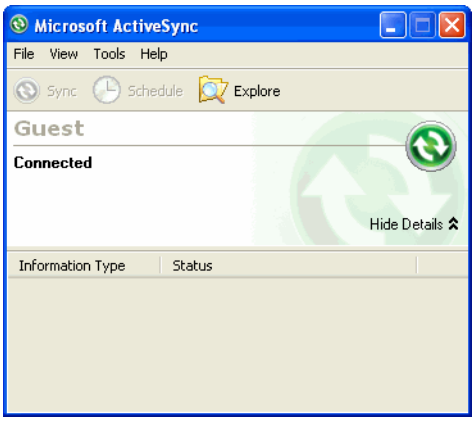


Figure 5-1 *ActiveSync Connected Window*

4. Select **Explore**.

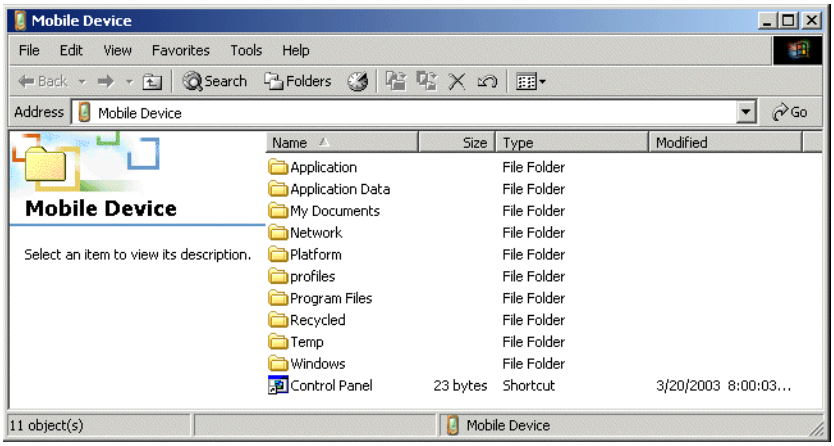


Figure 5-2 *ActiveSync Explorer*

5. Double-click the folder to expand the folder contents.

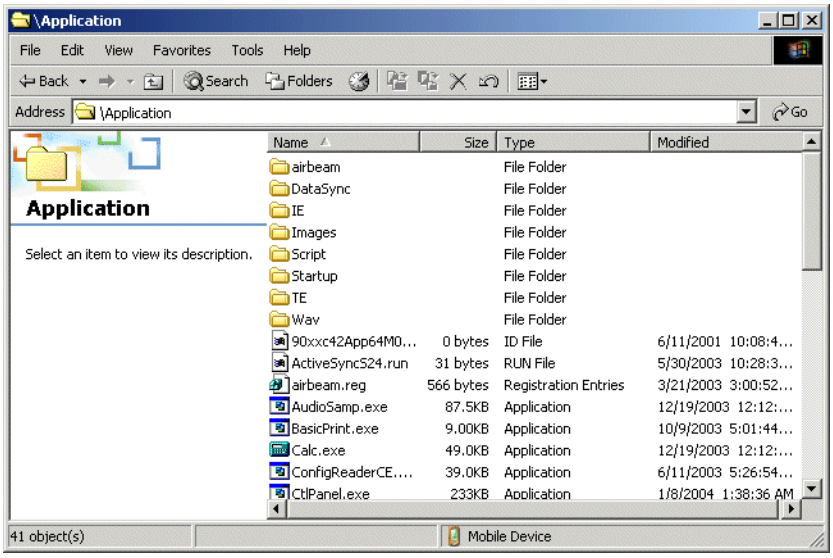


Figure 5-3 *Application Folder Contents*

6. Use Explorer to locate the host computer directory that contains the file to download. Tap that directory in the left pane to display its contents in the right pane.
7. Drag the desired file(s) from the host computer to the desired mobile device folder.

Adding Programs

Install the appropriate software on the host computer before installing it on the MC9190-G:

1. Download the program to the host computer (or insert the CD or disk that contains the program into the host computer). The program may consist of a single *.xip file, *.exe file, a *.zip file, or a Setup.exe file.
2. Read any installation instructions, ReadMe files, or documentation that comes with the program. Many programs provide special installation instructions.
3. Connect the MC9190-G to the host computer using an accessory described in *Chapter 2, Accessories*.
4. Ensure that a connection is established.

5. Double-click the executable file on the host computer.

   If the file is an installer, the installation wizard begins. Follow the directions on the window. Once the software is installed on the host computer, the installer transfers the software to the MC9190-G.

   If the file is not an installer, an error message states that the program is valid but is designed for a different type of computer. Copy this file to the MC9190-G. Follow the installation instructions for the program in the ReadMe file or documentation, or use ActiveSync Explore to copy the program file to the Program Files folder on the MC9190-G as described in *Copying Files from a Host Computer on page 5-6*. For more information on copying files using ActiveSync, refer to ActiveSync Help.

6. When installation is complete, tap **Start** > **Programs** on the MC9190-G, then tap the program icon.

Adding a Program from the Internet

1. Download the program to the MC9190-G from the Internet using **Internet Explorer**.
2. Read any installation instructions, Read Me files, or documentation that comes with the program. Many programs provide special installation instructions.
3. Tap the file, such as a .xip or .exe file, to launch the installation wizard. Follow the directions on the window.

Updating Images

The MC9190-G contains tools that update all operating system components. All updates are distributed as packages and/or hex images. Update packages can contain either partial or complete updates for the operating system. Motorola distributes the update packages on the Support Central Web Site, http://supportcentral.motorola.com.

Update an operating system component using one of the following:

- MSP. See *Mobility Services Platform on page 5-15* for more information.
- OS Update
- BootLoader.

Windows CE 6.0 OSUpdate Loader

Operating system component can be downloaded to the MC9190-G using the MC9190-G temp directory or an SD card.

Using MC9190-G Temp Directory

To initiate an update using the MC9190-G temp directory:

1. Go to the Support Central web site, http://supportcentral.motorola.com.
2. Download the appropriate update package.
3. Connect the MC9190-G to a host computer using the Single Slot Serial/USB Cradle or USB Communication Cable. See *Chapter 2, Accessories*.
4. On the host computer, use ActiveSync to copy the update package to the *temp* directory on the MC9190-G.
5. On the MC9190-G, use **Windows Explorer** and navigate to the *temp* directory.
6. Open the *OSUpdate* folder.

7. Double tap on the file: 9100c60Ben_TEMP.lnk.
8. When the OS Update application finds the appropriate file, it loads the package onto the MC9190-G. A progress bar displays until the update completes.
9. When complete, the MC9190-G re-boots and the calibration screen appears.

Using an SD Card

To initiate an update using an SD card:

1. Go to the Support Central web site, http://supportcentral.motorola.com.
2. Download the appropriate update package.
3. Copy the update package to the root directory of an SD card (using a host computer).
4. Suspend the MC9190-G.
5. Remove the keypad. See *Keypads on page 2-4* for more information.
6. Install the SD card.
7. Replace the keypad. See *Keypads on page 2-4* for more information.
8. Connect the MC9190-G to AC power. See *Chapter 2, Accessories*.
9. Press the Power button to turn on the MC9190-G.
10. Use Windows Explorer to navigate to the SD card folder.
11. Open the *OSUpdate* folder.
12. Double tap on the file: 9100c60Ben_SD.lnk
13. When the OS Update application finds the appropriate file, it loads the package onto the MC9190-G. A progress bar displays until the update completes.
14. When complete, the MC9190-G re-boots and the calibration screen appears.

Bootloader

Use Bootloader to download hex files to the MC9190-G from an SD card or from a host computer via USB.

Loading Files From an SD Card

To load the hex files on to the MC9190-G using an SD card:

1. Copy the files to the root directory of an SD card.
2. Remove the keypad. See *Keypads on page 2-4*.
3. Insert the SD card into the MC9190-G.
4. Install the keypad. See *Keypads on page 2-4*.
5. Press the primary battery releases. The battery partially ejects from the MC9190-G.
6. Simultaneously press and release the **Power** button and the trigger.
7. Immediately, as soon as the device starts to boot, press and hold the trigger.
8. Continue to hold the trigger until the Bootloader screen appears.

9. When the **Bootloader** screen appears, release the trigger.

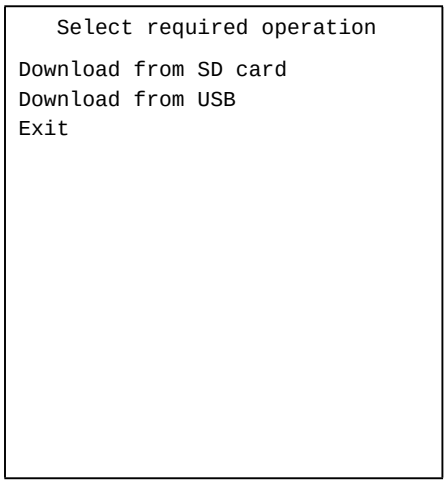


Figure 5-4 *Bootloader Menu*

CAUTION To ensure a successful download, do not remove power from the MC9190-G while in Bootloader.

1. Use the up and down scroll buttons to select **Download from SD card**, then press **Enter**.
2. The Bootloader displays the hex files available on the SD card.

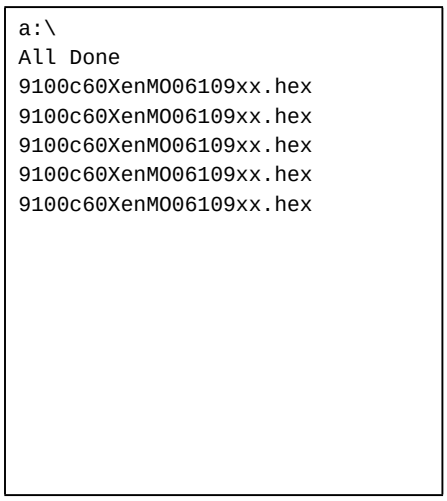


Figure 5-5 *Hex File List*

3. Use the up and down scroll buttons to select a hex file, then press **Enter**.
4. The hex file is downloaded to the device.

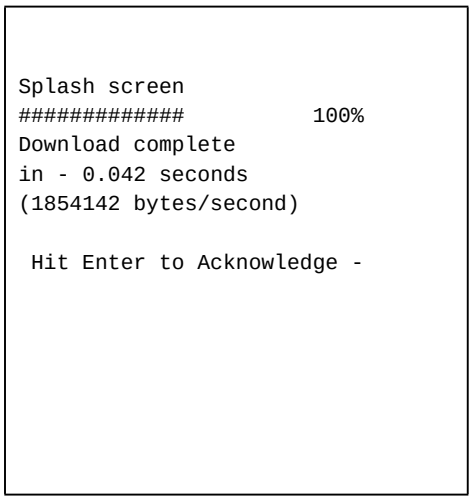


Figure 5-6 *Download Complete Screen*

5. On completion, press **ENTER** to return to the Bootloader menu to select the next file to download.
6. To exit Bootloader, select **Exit** from the Bootloader main screen and press **ENTER**.

Loading Files via USB

Use Bootloader to download customized flash file system partitions to the MC9190-G and load hex files to the flash memory of the MC9190-G.

To load the hex files on to the MC9190-G using USB:

1. Download the *WCE USBDownload* application from the Support Central web site. Follow the installation instructions with the application.
2. Connect the MC9190-G to a host computer using the Single Slot Serial/USB Cradle or USB Cradle Cable.
3. On the host computer, launch the *WCE USBDownload* application.

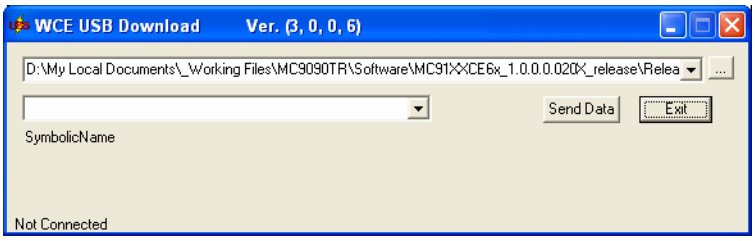


Figure 5-7 *USB Download Window*

4. Press the primary battery release to partially eject the battery from the MC9190-G.
5. Press and hold the trigger and then press and release the **Power** button.
6. Continue to hold the trigger and push the battery back into the MC9190-G.
7. When the **Bootloader** screen appears, release the trigger.

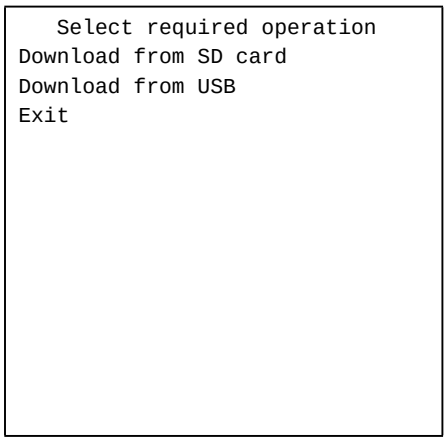


Figure 5-8 *Bootloader Screen*

CAUTION To ensure a successful download, do not remove power from the MC9190-G while in Bootloader.

8. Place the MC9190-G into a Single Slot Serial/USB Cradle.
9. Use the up and down scroll buttons to select **Download from USB**, then press **ENTER**.
10. The Bootloader displays the following:

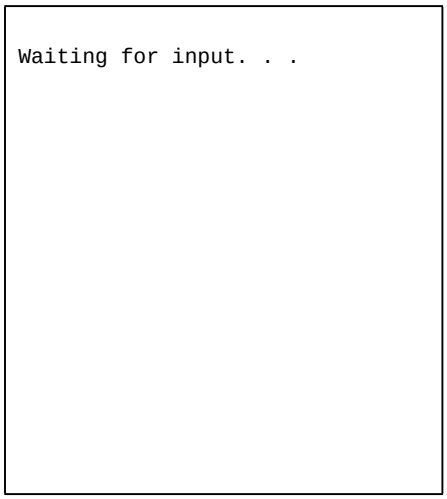


Figure 5-9 *Waiting for Input*

11. On the *WCE USBDownload* application, locate the hex files to download.

NOTE One hex file or multiple hex files can be selected. To select multiple files, press the **Ctrl** key while selecting files.

If selecting multiple files to download, USBDownload reads the header of the file and identifies the file type. If the Partition table file is among the files selected, then USBDownload downloads that file first. Similarly, USBDownload downloads the CPLD file last.

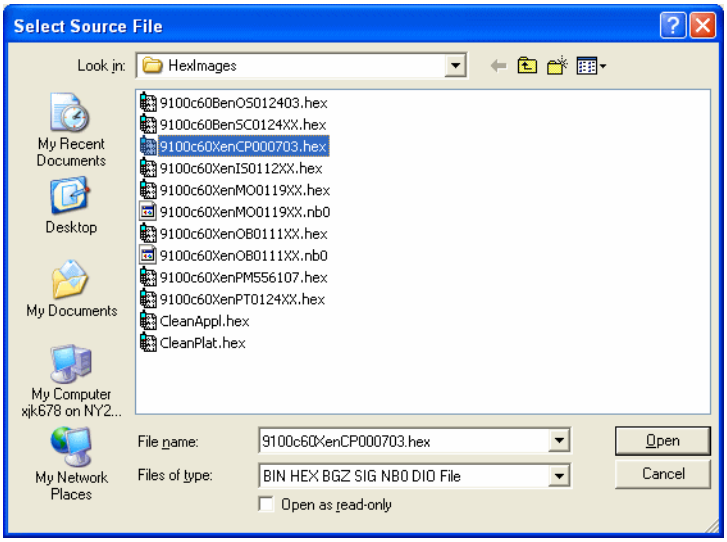


Figure 5-10 *Select Source File Window*

12. Select the hex files and the click **Open**.
13. Click the **SEND DATA** button. The hex file is downloaded to the MC9190-G.

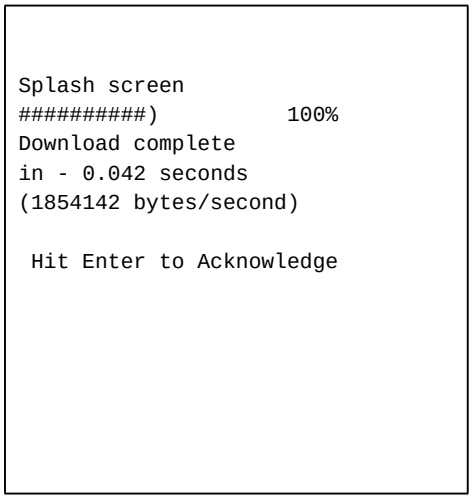


Figure 5-11 *Download Complete Screen*

14. On completion, press **ENTER** to return to the Bootloader main screen to select the next file to download.
15. To exit Bootloader, select **Exit** from the Bootloader main screen and press **ENTER**.

Bootloader Error Detection

While receiving data, Bootloader performs many checks on the data to ensure that the data is received correctly. If an error is detected, Bootloader immediately aborts the download, and reports the error on an error screen.

This error message screen displays until a key is pressed. Once the screen is acknowledged, Bootloader returns to the main menu to wait for a new selection.

To find the probable cause of the error, use the error number and/or the error text displayed on the screen to look up the error in *Table 5-1*.

Table 5-1 *Bootloader Errors*

Error Text	Error Number	Probable Cause
Unknown error	-1	A general error occurred. Retry the download. If the failure persists, it is most likely due to a hardware failure; the MC9190-G requires servicing.
Cancelled by user	-2	The user cancelled the download.
Can't open the source	-7	An error occurred opening the source device (either USB or SDMMC). Check source device connectivity and retry.
Can't open the destination	-8	An error occurred opening the destination device (either NAND, RAM, Power Micro, IST, Keyboard Controller or CPLD). Retry the download. If the failure persists, it is most likely due to a hardware failure; the MC9190-G requires servicing.
Can't read from the source device	-9	The source device (either USB or SDMMC) could not be read from. Check source device connectivity and retry.
Can't write to the destination device	-10	The destination device (either NAND, RAM, Power Micro, IST, Keyboard Controller or CPLD) could not be written to. Retry the download. If the failure persists, it is most likely due to a hardware failure; the MC9190-G requires servicing.
Transmission checksum error	-11	An error occurred during transmission from the source device (either USB or SDMMC) and the checksum check failed. Check source device connectivity and retry.
Readback checksum error	-12	A checksum, generated from reading back data that was written to the destination device, was incorrect. An error during transmission or a write error to the destination device could cause this.
There is no more heap space available	-14	There is no more heap space available for the download procedure. Restart Bootloader and retry the download. If the failure persists, contact service with details of what is being downloaded.
Invalid data in verify file	-19	The file contains invalid data. Check that the file is suitable for downloading on this terminal.
Insufficient memory for buffering data	-20	There is no more heap space available for the download procedure. Restart Bootloader and retry the download. If the failure persists, contact service with details of what is being downloaded.
Insufficient data available to complete record	-21	A HEX file download was attempted but the HEX file is invalid. Ensure the file is in proper HEX file format.
Invalid Symbol HEX file	-23	A HEX file download was attempted but the HEX file is invalid. Ensure the file is in proper HEX file format.
Unrecognized or unsupported HEX record	-24	The HEX file being downloaded contains an invalid or unrecognized HEX record. Ensure the file is in proper HEX file format.

Table 5-1 *Bootloader Errors (Continued)*

Error Text	Error Number	Probable Cause
Invalid data in HEX file	-25	The HEX file being downloaded contains invalid data. Ensure the file is in proper HEX file format with valid HEX data.
Exceeded max size	-26	The download file is too large to fit into the space allocated for it. Either make the file smaller or increase the space allocated for it by altering the partition table.
Partition is not valid on this device	-27	The downloaded file specifies a partition entry that does not exist on the device. Only download files that are valid for this device, or change the partition table so that the new file is valid on the device.
Wrong destination code	-28	A specific partition was chosen from the *Bootloader* main menu but the file selected for download was for another partition. Ensure that the partition selected from the *Bootloader* main menu matches the file selected for download.
Non-contiguous record found	-30	A HEX file download was attempted but the HEX file is invalid. Ensure the file is in proper HEX file format.
Timed Out - No data	-31	Bootloader was waiting for data from the source device but timed out before receiving any. Check the source device connectivity and retry.
Invalid file format	-33	The file format is invalid. Only HEX files are supported by Bootloader.
Partition Table not Valid	-34	The size of flash memory is different than that described in the partition table. Retry the download with the correct partition table file.
Invalid data in file	-35	The .bin or .sig file being downloaded contains invalid data. Ensure the file is in proper file format.
File cannot be loaded to this unit	-38	The file contains valid data that indicates it cannot be loaded onto the device.
File validation failed	-40	The file has either been signed incorrectly, or contains data that indicates that it cannot be loaded onto the terminal.

Mobility Services Platform

The MSP 3 Client Software is a set of software components that come pre-installed on the MC9190-G. The MSP 3 Client software consists of the following components:

The RD Client provides support for MSP 3 Staging functionality, provides support for the MSP 3 Legacy Staging process, and provides support for backward-compatible legacy MSP 2.x Legacy Staging functionality.

The MSP 3 Agent provides MSP 3 Provisioning functionality and Control functionality when used with MSP 3.2 Control Edition.

Refer to the *Mobility Services Platform 3.2 User's Guide*, p/n 72E-100158-06, for instructions for using the Rapid Deployment and MSP3 Agent clients.

Creating a Splash Screen

A custom splash screen can be created and loaded onto the MC9190-G. To create a custom splash screen:

1. Create a .bmp file using a graphic program with the following specifications:
   - Size: 296 H x 240 H.
   - Colors: 16 bits per pixel (65536 colors).
2. Modify the bitmap file and save.

To load the splash screen on the MC9190-G Windows CE device:

1. Convert the bmp file into a hex file using the OSUpdate Package Builder that is part of MSP.
2. Copy the hex file to the MC9190-G using BootLoader. See *Bootloader on page 5-9*.

Chapter 6 Application Deployment for Windows Mobiles

Introduction

This chapter describes new features in Windows Mobile 6.5 including new security features, how to package applications, and procedures for deploying applications onto the MC9190-G.

Security

The MC9190-G implement a set of security policies that determine whether an application is allowed to run and, if allowed, with what level of trust. To develop an application, you must know the security configuration of the device, and how to sign an application with the appropriate certificate to allow the application to run (and to run with the needed level of trust).

Application Security

Application security controls the applications that can run on the MC9190-G.

- Trusted - All applications must be digitally signed by a certificate on the MC9190-G.
- Prompted - User is prompted to allow unsigned applications to run.
- Open - All applications run.

Developers can include their own certificates and provision the device to “trusted.”

Digital Signatures

Digital signatures provide a way to authenticate the author of EXEs, DLLs, and packages. Digitally signed applications give users confidence that an application comes from where they think it comes from. For example, if an end-user downloads an update package from the internet that is digitally signed with Motorola's software certificate, they are assured that the package is authentic and that it was created by Motorola. By enforcing the use of digital signatures, users can also prevent malicious applications from executing on the MC9190-G. For example, users can provision the MC9190-G to only execute “trusted” applications (digitally signed).

Motorola ships all Windows Mobile 6.5 based products in an “open” state, which means all signed and unsigned applications should work. However, customers can still reconfigure their MC9190-G to operate in the “trusted”

mode. This means that only applications signed with a certificate from the Privileged Execution Trust Certificate Store can run.

To support the broadest number of deployments, third-party software developers should perform the following when releasing software for a Windows Mobile 6.5 devices:

- Sign all their EXEs & DLLs with their private key
- Provide the corresponding public certificate to end-users so that it can be installed into Privileged Execution Trust Certificate Store.

If the software is installed via a .CAB file, developer should also:

- Sign the .CAB file with their private key
- Provide the corresponding public certificate to end-users so that it can be installed into SPC Certificate Store.

Locking Down a MC9190-G

Like most configuration options in Windows Mobile 6.5, security settings are set via XML provisioning. For example, to enforce the “trusted” model and only allow applications signed with a privileged certificate to run, use the following provisioning document:

```
<wap-provisioningdoc>
<characteristic type=”SecurityPolicy”>
        <!-- Disallow unsigned apps -->
<parm name= “4102” value= “0”/>

<!-- No Prompt -->
<parm name= “4122” value= “1”/>
</characteristic>
</wap-provisioningdoc>
```

For more information on various security options, refer to the Security Policy Settings topic in the latest Windows Mobile documentation.

Installing Certificates

Use XML provisioning to query and delete certificates from certificate stores. To add a new certificate the Privileged Execution Trust Certificate Store, use the following sample provisioning document:

```
<wap-provisioningdoc>
<characteristic type= “CertificateStore”>
<characteristic type= “Privileged Execution Trust Authorities”>
<characteristic type= “657141E12FA45786F6A57CA6464032D4B3A55475”>
<parm name= “EncodedCertificate” value= “
This is sample text. This is sample text. This is sample text. This is sample text.
This is sample text. This is sample text. This is sample text. This is sample text.
This is sample text. This is sample text. This is sample text. This is sample text. = “/>
</characteristic>
</characteristic>
</characteristic>
</wap-provisioningdoc>
```

To create your own provisioning document with real certificate information:

1. Obtain a certificate from a security provider such as VeriSign.
2. Double-click on the certificate file (.CER) to open it.
3. Click on the *Details* tab and locate the *Thumbprint* field.
4. Copy the contents of the *Thumbprint* field and replace the value in the XML example above.
5. Click the **Copy to File…** button.
6. Click **Next** to start the Certificate Export Wizard.
7. Select *Base-64 encoded X.509 (.CER)* and then click **Next**.
8. Set the File Name to CertOutput.xml and click **Next**.
9. Click **Finish** to export the certificate.
10. Open the exported file, CertOutput.xml, in a text editor (i.e., NotePad).
11. Copy the contents of the file (excluding the first line, last line, and CR/LF) and replace the value of the *“EncodedCertificate”* parameter in the xml example above.

Device Management Security

You can control access to certain device settings and security levels, such as installing applications and changing security settings. Refer to the *Windows Mobile Version 6 Help* file for information on device management security.

Remote API Security

The Remote API (RAPI) enables applications that run on a desktop to perform actions on a remote device. RAPI provides the ability to manipulate the file system on the remote device, including the creation and deletion of files and directories. By default, Motorola ships with RAPI in the restricted mode. Certain tools, such as RAPIConfig,

may not work properly. Refer to the *Windows Mobile Version 6 Help* file for finding information on Remote API security policies.

XML Provisioning

To configure the settings on an MC9190-G, use XML provisioning. To install an XML provisioning file on the MC9190-G, create a Cabinet Provisioning File (CPF). A CPF file is similar to a CAB file and contains just one file: _setup.xml. Like a CAB file, the CPF extension is associated with WCELoad.EXE. Opening a CPF extracts the XML code and uses it to provision and configure the MC9190-G. The user receives an e-mail notification indicating success or failure.

XML provisioning provides the ability to configure various features of the MC9190-G (i.e., registry and file system). However, some settings require security privileges. To change registry settings via a CPF file, you must have certain privileges (roles). Some registry keys require you to simply be an *Authenticated User*, while other registry keys require you to be a *Manager*. Refer to the *Microsoft Windows Mobile 6 Help* file, *Metabase Settings for Registry Configuration Service Provider* section, for the default role settings in Windows Mobile 6.5.

For those registry settings that require the *Manager* role, the CPF file must be signed with a privileged certificate installed on the device. Refer to the *Microsoft Windows Mobile 6 Help* file and the *Windows Mobile 6 SDK* for instructions and sample test certificates.

Creating an XML Provisioning File

To create a .cpf file:

1. Create a valid provisioning XML file named _setup.xml using an XML editor or the tools supplied with Visual Studio 2005. (For example, use the SampleReg.xml sample created in the *RegMerge* section and rename it _setup.xml.) Ensure the file contains the required parameters for the operation. Refer to the *Microsoft Windows Mobile 6 Help* file for information.
2. In the Windows Mobile 6.5 tools directory on the desktop computer (typically \Program Files\Windows CE Tools\wce500\Windows Mobile 6 Pocket PC SDK\Tools), run the Makecab.exe utility, using the following syntax to create a .cpf file from the _setup.xml file:

   MakeCab.exe /D COMPRESS=OFF _setup.xml myOutCpf

   NOTE COMPRESS=OFF is required for backward compatibility with Pocket PC.
3. Optionally, use the Authenticode tools to sign the .cpf file.
4. Tap the filename to install.
5. Certain applications and settings require a cold boot to take affect. In these cases, cold boot the MC9190-G. Refer to the *Windows Mobile Version 6 Help* file for more information.

XML Provisioning vs. RegMerge and Copy File

Prior to Windows Mobile 6.5, Motorola used two drivers (RegMerge and CopyFiles) to update the registry and to copy files during a cold boot. With Mobile 6.5, Motorola recommends using XML provisioning instead. RegMerge and CopyFiles are supported for backward compatibility but Motorola may eliminate support in the future. The following sections provide examples of how RegMerge and CopyFiles were used, and how to perform the same function using XML provisioning.

RegMerge

RegMerge.dll is a built-in driver that allows updating the registry during a clean boot. RegMerge runs very early in the boot process and looks for registry files (.reg files) in certain Flash File System folders (i.e., \Application) during a clean boot. It then merges the registry changes into the system registry located in RAM.

The following example uses RegMerge to set a registry key:

SampleReg.reg

```
[HKEY_LOCAL_MACHINE\Hardware\DeviceMap\Backlight]
“BacklightIntensity”=dword:00000036
```

The following example uses XML provisioning to perform the same task:

SampleReg.xml

```
<wap-provisioningdoc>
    <characteristic type= “Registry”>
        <characteristic type= “HKLM\Hardware\DeviceMap\Backlight”>
            <parm name= “BacklightIntensity” value= “54” datatype= “integer” />
        </characteristic>
    </characteristic>
</wap-provisioningdoc>
```

CopyFiles

CopyFiles copies files from one folder to another on a clean boot. During a clean boot CopyFiles looks for files with a .CPY extension in the root of the Application FFS partition. These files are text files containing the source and destination for the desired files to copy, separated by “>”.

The following example uses CopyFiles to copy a file from the \Application folder to the \Windows folder:

SampleCpy.cpy

```
\Application\example.txt > \Windows\example.txt
```

The following example uses XML provisioning to perform the same task:

SampleCpy.xml

```
<wap-provisioningdoc>
    <characteristic type= “FileOperation”>
        <characteristic type= “\Windows” translation= “filesystem”>
            <characteristic type= “MakeDir”/>
            <characteristic type= “example.txt” translation= “fileystem”>
                <characteristic type= “Copy”>
                    <parm name= “Source” value= “\Application\example.txt” translation= “filesystem”/>
                </characteristic>
            </characteristic>
        </characteristic>
    </characteristic>
</wap-provisioningdoc>
```

Packaging

Packaging combines an application's executable files into a single file, called a package. This makes it easier to deploy and install an application to the MC9190-G. Package new applications and updates, such as new DLL files, as CAB files, then deploy them to the MC9190-G. Refer to the *Microsoft Windows Mobile 6 Help* file for information on CAB files.

Software Installation on Development PC

To develop applications to run on the MC9190-G, use the Enterprise Mobility Developer Kit (EMDK) for C

The EMDK for C is a development tool used to create native C and C++ applications for the Motorola MC9190-G. It includes documentation, header files (.H), and library files (.LIB) for native code application development that targets Motorola value-add APIs.

The software requirements to use the EMDK for C are:

- Microsoft Windows XP 32-bit Edition or Microsoft Windows Vista 32-bit Edition
- Microsoft ActiveSync 4.5 or higher. (only for Windows XP, Windows Vista has its own Mobile Device Center)
- If developing applications for Windows Mobile 6.X or Windows CE 6.0
  - Microsoft® Visual Studio 2005
  - Microsoft® Visual Studio 2005 Service Pack1

  (or)
  - Microsoft® Visual Studio 2008
  - Microsoft® Visual Studio 2008 Service Pack1
- One or more of the following Platform SDK's:
  - Windows Mobile 6 Professional and Standard Software Development Kits Refresh
- For Windows CE embedded development use the Motorola Platform SDK (PSDK) for your specific device. The PSDK can be found on the device download page at: http://www.supportcentral.motorola.com.

EMDK for C

To download and install the EMDK for C:

1. Download the EMDK from the Support Central web site, http://supportcentral.motorola.com.
   a. Select *Mobile Computers*. The *MC9190-G Product* page displays.
   b. Select *MC*9190-G. The *MC9190-G Product* page displays.
   c. On the *MC9190-G Product* page, select the appropriate *Enterprise Mobility Developer Kit for C* from the *Software Downloads* section. The *Enterprise Mobility Developer Kit for C* page displays.
   d. Select the latest version, and save the .exe file to the development computer.
2. Locate the .exe file on the development computer, double-click the executable file and follow the install screen prompts.
3. Once installed, access the components of the EMDK for C from the *Enterprise Mobility Developer Kit for C* program group of the *Windows Start* menu.
4. The sample applications provide examples of how to interface with the Motorola API functions. To build a sample application, open the Samples folder from the Windows *Start* menu. Open the folder for the desired sample and then open the project file. The project file has an extension of VCP. Microsoft Visual C++ v4.0 automatically launches. Select *WinCE* as the Active WCE Configuration. Select Win32 (WCE ARMV4) Debug as the active configuration.

✓ ***NOTE*** If both Microsoft Visual C++ v3.0 and Microsoft Visual C++ v4.0 are installed on the development computer, ensure Microsoft Visual C++ v4.0 launches.

Installing Other Development Software

Developing applications for the MC9190-G may require installing other development software, such as application development environments, on the development PC. Follow the installation instructions provided with the software.

Software Updates

Download updates to the EMDK for C from the Support Central web site at: http:supportcentral.motorola.com. Check this site periodically for important updates and new software versions.

Windows Mobile File Storage

Windows Mobile 6.5 contains three types of file storage:

- Random Access Memory (RAM)
- Persistent Storage
- Application folder.

Random Access Memory

Executing programs use RAM to store data. Data stored in RAM is lost upon a warm boot. RAM also included a volatile file storage area called *Cache Disk*.

Volatile File Storage (Cache Disk)

Windows Mobile 6.5 memory architecture uses persistent storage for all files, registry settings, and database objects to ensure data is retained even after a power failure. Persistent storage is implemented using Flash memory technology which is generally slower than volatile RAM memory. In certain situations the speed of the operation is more important than the integrity of the data. For these situations, Motorola has provided a small volatile File Storage volume, accessed as the *Cache Disk* folder. Disk operations to the *Cache Disk* folder are much faster than to any of the persistent storage volumes, but data is lost across warm boots and power interruptions. Note that a backup battery powers RAM memory, including the *Cache Disk*, when you remove the main battery for a short period of time.

The MC9190-G uses the *Cache Disk* for temporary data that can be restored from other sources, for example, for temporarily “caching” HTML web pages by a browser or generating formatted files to send to a printer. Both situations benefit from the increased speed of the cache disk, but you can restore the data if needed.

DO NOT use the *Cache Disk* as a method to improve application performance. Analyze applications that perform slower in persistent storage to optimize disk access. Common areas for optimization include minimizing the number of reads and writes to a file, removing unneeded debug logging, and minimizing file flushing or closing files.

Persistent Storage

Windows Mobile 6.5 protects all data and applications from power-related loss. Because Windows Mobile 6.5 mounts the entire file system and registry in persistent storage (rather than using RAM), MC9190-G devices provide a reliable storage platform even in the absence of battery power.

Persistent storage provides application developers with a reliable storage system available through the standard file system and registry APIs. Persistent storage is optimized for large reads and writes; therefore, applications reading and writing data in large chunks tend to outperform those applications reading and writing small blocks of data. Data in persistent storage is lost upon a clean boot.

Persistent storage contains all the directories under the root directory except for Application, Cache Disk, and Storage Card (if a storage card is installed). Persistent storage is approximately 700 MB (formatted).

Application Folder

The Application folder is a super-persistent storage that is persistent even after a clean boot. Accessing data in the Application folder is slower than accessing persistent storage. The Application folder is used for deployment and device-unique data. For example, network profiles can be stored in the Application folder so that connection to the network is available after a cold boot. The Application folder is approximately 117 MB (formatted).

Deployment

To install applications onto the MC9190-G, developers package the application and all required files into a CAB file, then load the file onto the MC9190-G using one of the following options:

- Microsoft ActiveSync 4.5 or higher
- Storage Card
- MSP 3.2
- AirBEAM
- Image Loader Image (for updating the operating system).

Refer to the *Microsoft Windows Mobile 6 Help* file for information on CAB files.

Installation Using ActiveSync

To install an application package:

- Connect the MC9190-G to a host computer using ActiveSync. See *Chapter 3, Synchronization* for more information.
- Locate the package file on the host computer.
- In **ActiveSync** on the host computer, open ***Explorer*** for the MC9190-G.
- Copy the CAB file from the host computer to the \temp directory on the MC9190-G.
- On the MC9190-G, navigate to the \temp directory.
- Tap on the application CAB file. The application installs on the MC9190-G.

Installation Using Storage Card

To install an application package:

- Copy the package CAB file to an storage card using an appropriate storage card reader.
- Install the storage card into the MC9190-G. Refer to the *MC9190-G User Guide* for more information.
- On the MC9190-G, open **File Explorer**.
- Open the *Storage Card* directory.
- Tap the package CAB file. The application installs on the MC9190-G.

Installation Using USB Connection

To install an application or copy files to the MC9190-G using a USB connection:

1. On the MC9190-G, tap **Start** > **Settings** > **System** > **USB Config**.

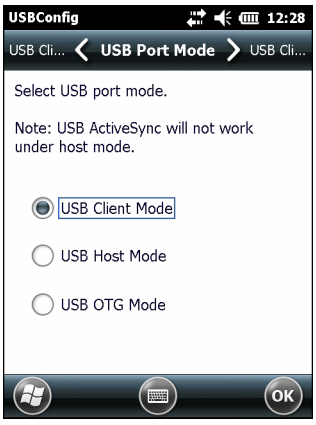


Figure 6-1 *USBConfig Window*

2. Tap **USB Client** radio button.
3. Select the **USB Client Mode** tab.

4. Select the **Mass Storage** checkbox.
5. In the drop-down list, select either **\Storage Card**, **\Application** or **\Cache Disk**.
6. Tap **OK**.
7. Connect the MC9190-G to a host computer using either a single slot cradle or a USB cable.
8. On the host computer, open **Windows Explorer**. The MC9190-G appears as a hard disk drive in **Windows Explorer**.
9. Double-click the drive letter to open the folder.
10. On the host computer, open another **Windows Explorer** window and locate the files to copy to the MC9190-G.
11. Drag the files from the new window to the MC9190-G folder window.
12. When complete, disconnect the MC9190-G from the host computer.

Installation Using AirBEAM

The AirBEAM Smart Client provides backward-compatible legacy AirBEAM functionality and backward-compatible legacy MSP 2.x Level 2 Agent functionality.

Refer to the AirBEAM Smart Windows CE Client Product Reference Guide, p/n 72-63060-xx, for instructions for AirBEAM Smart client.

Mobility Services Platform

The Mobility Services Platform (MSP) 3 Client Software is a set of software components that come pre-installed on the MC9190-G. The MSP 3 Client software consists of the following components:

The RD Client provides support for MSP 3 Staging functionality, provides support for the MSP 3 Legacy Staging process, and provides support for backward-compatible legacy MSP 2.x Legacy Staging functionality.

The MSP 3 Agent provides MSP 3 Provisioning functionality and Control functionality when used with MSP 3.2 Control Edition.

Refer to the Mobility Services Platform 3.2 User's Guide, p/n 72E-100158-xx, for instructions for using the Rapid Deployment and MSP3 Agent clients.

Update Loader Image

Windows Mobile contains an Image Update feature that updates all operating system components. All updates are distributed as update packages. Update packages can contain either partial or complete updates for the operating system. Motorola distributes the update packages on the Support Central Web Site, http://supportcentral.motorola.com.

To update an operating system component, copy the update package to the MC9190-G using one of a variety of transports, including ActiveSync, an microSD card, AirBEAM or MSP.

Download Update Loader Package

1. Go to the Motorola Support Central web site, http://supportcentral.motorola.com.
2. Download the appropriate update loader package to a host computer.
3. Locate the update loader package file on the host computer and un-compress the file into a separate directory.

ActiveSync

To install an update loader package using ActiveSync:

1. Connect the MC9190-G to a host computer using ActiveSync. See *Chapter 3, Synchronization* for more information.
2. In ActiveSync on the host computer, open **Explorer** for the MC9190-G.
3. Copy all the update loader package files from the host computer to the \temp directory on the MC9190-G.
4. On the MC9190-G, navigate to the \temp directory.
5. Tap on the update loader file, **STARTUPDLDR.EXE**. The Update Loader application installs the update loader package on the MC9190-G.
6. The MC9190-G re-boots and immediately starts the update.

   A progress bar displays until the update completes.
7. The MC9190-G re-boots.
8. The calibration screen appears.

SD Card

To install an update loader package using an SD card:

1. Copy all the update loader package files to the root directory of the SD card.
2. Install the SD card into the MC9190-G.
3. Connect the MC9190-G to AC power. See *Chapter 2, Accessories*.
4. Perform a cold boot.
5. Immediately, as soon as the device starts to boot and before the splash screen is visible, press and hold the trigger.
6. The Update Loader application looks for the update loader file in the root directory of the SD card.

   When it finds the file, it loads the update loader package onto the MC9190-G. A progress bar displays until the update completes.
7. The MC9190-G re-boots.
8. The calibration screen appears.

Creating a Splash Screen

Use a bitmap file to create a customized splash screens for the MC9190-G. Use Image Update with a bitmap file, rather than a package file, to update the splash screen.

To create a custom splash screen:

1. Create a .bmp file using a graphic program with the following specifications:
   - Size: 592 H x 480 W.
   - Colors: 16 bits per pixel (65536 colors) for color displays.
2. Modify the bitmap file and save.

To load the splash screen on the MC9190-G:

1. Create a text file named pkgs.lst which contains the name of the bmp file. For example, *mysplash.bmp*.
2. Copy the bmp file and the pkgs.lst file to one of the following:
   - SD card root directory
   - MC9190-G's \temp directory.
3. If using the SD card, insert the SD card into the MC9190-G.
4. Perform a cold boot.
5. Immediately, as soon as the device starts to boot and before the splash screen is visible, press and hold the trigger.

Chapter 7 Interactive Sensor Technology Configuration

Introduction

This chapter provides information for configuring the Interactive Sensor Technology (IST) settings. IST settings can be accessed:

- On Windows Mobile, tap **Start** > **Settings** > **System** > **IST Settings**.
- On Windows CE, tap the **IST Settings** icon in the Task Tray.

IST Menu

On Windows CE, tap the **IST Settings** icon to open the menu. This menu lists IST configuration settings.

Figure 7-1 *IST Settings Icon Menu*

Use this menu to access the configuration settings listed in *Table 7-1*. An enabled options is indicated with a check mark next to the option.

Table 7-1 IST Tray Icon Menu Items

Menu Item	Description
Configure IST	Opens the **IST Settings** window.
Hide	Removes **IST Settings** icon from the Command bar.
Wake Up On Motion	Wakes the MC9190-G from suspend mode if it was placed in suspend mode due to inactivity.
Keep Alive On Motion	Prevents going into suspend mode motion is detected. See *Keep Alive On Motion on page 7-3* for more information.
Auto Display Orientation	Enables auto display orientation. See *Display Tab on page 7-4* for more information.

General Tab

Use the **General** tab to view IST software information and control the display of the **IST Setting** icon.

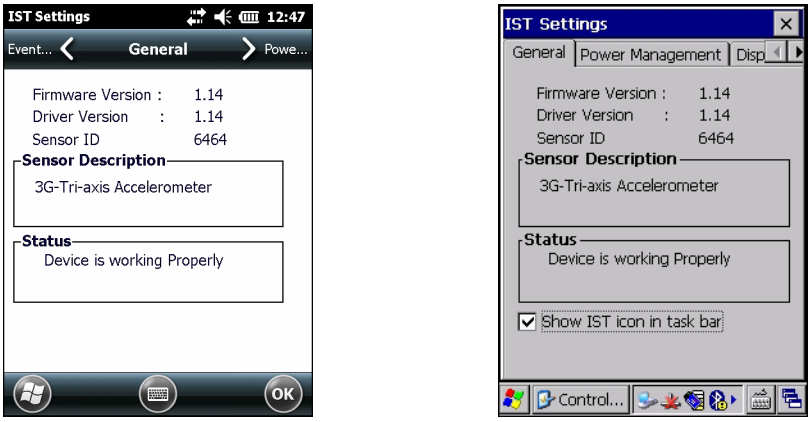


Figure 7-2 *General Tab*

Table 7-2 IST General Tab Information

Item	Description
Firmware Version	Displays the version information of IST device firmware.
Driver Version	Displays the version information of IST driver.
Sensor ID	Displays identification tag of the sensor.
Sensor Description	Displays a description of the sensor.

Table 7-2 IST General Tab Information

Item	Description
Status	Displays status information of the IST device. If the IST is not working properly it displays the error message.
	Device working Properly - Normal state. **IST Hardware not present** - When there is no response from IST hardware. Please contact service department. **Need calibration** - Device is not calibrated. Contact your system administrator.
Show IST service icon in task bar	Enables the **IST Setting** icon to display in the Command bar.

Power Management Tab

Use the **Power Management** tab to configure power management settings.

Figure 7-3 *Power Management Tab*

Keep Alive On Motion

Select the **Enabled** checkbox to prevent the MC9190-G from going into suspend mode while it is in motion. The motion sensitivity is configurable. To set the sensitivity, tap the **Change Sensitivity…** button.

NOTE There is no time out defined for suspend due to IST inactivity. To aggressively manage power, while there is no motion, set the MC9190-G suspend time out to a very short time using system power settings. This setting suspends the MC9190-G when there is no motion activity or any other activity within this set time out.

On Face Down

The **On Face Down** section provides configurable options to control what happens when the MC9190-G is placed with the display face down.

Select the **Display Off** checkbox to turn off the backlight when the MC9190-G is placed face-down. The backlight automatically powers on when the MC9190-G is tuned face-up.

Select the **Suspend** checkbox to suspend the MC9190-G when it placed face-down. To wake the MC9190-G use the controls listed in the **Wake Up on Motion** section below.

Wake Up on Motion

The **Wake Up on Motio**n section provides configurable options for waking the MC9190-G from suspend mode by shaking the MC9190-G.

Select **Inactivity** checkbox to allow IST to wake the MC9190-G when it was suspended due to inactivity.

Use the **Change Sensitivity…** button to configure the sensitivity settings.

Setting Sensitivity

Use the slider to set the sensitivity. A low setting indicates that a harder shake (faster movement) is required for the IST to initiate a wake up action. The sensitivity can be set from “0” to “10” and when the sensitivity is set to lower values a simple shake/motion can be detected by IST. A high setting allows IST to issue a wake up action when an easier movement to the MC9190-G is detected. Shake the MC9190-G to test the set sensitivity. An audio sound is heard and a message is displayed on screen when the shaking level reaches the set sensitivity level.

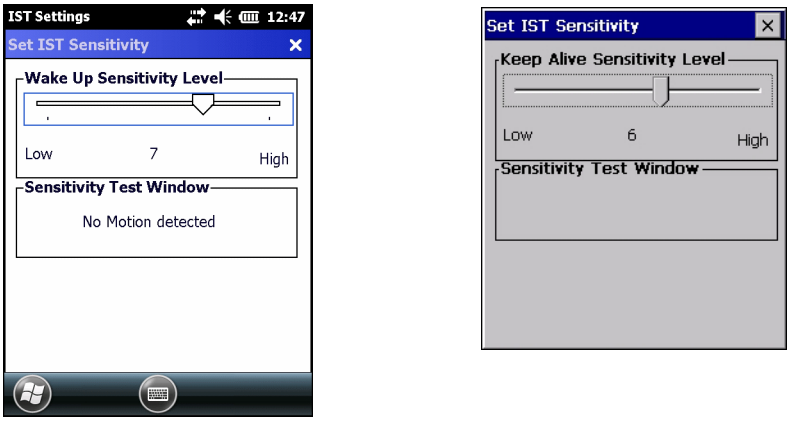


Figure 7-4 *Set IST Sensitivity Window*

Display Tab

Use the **Display** tab configure display interaction settings.

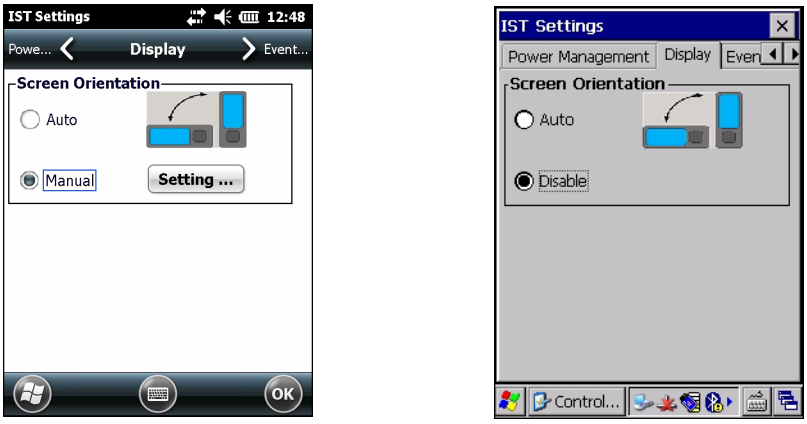


Figure 7-5 *Display Tab*

The Auto Orientation parameter controls the display rotation according to the MC9190-G orientation. Select the **Auto Orientation** checkbox to enable this feature. Auto orientation is disabled by default.

Event Log Tab

Use the **Event Log** tab to display the event details. This feature in IST mainly focuses on abuse by dropping the device.

Figure 7-6 *Event Log Tab*

The **Motion Event Summery** list displays a summary of the event report. To view the full report tap the **Motion Event Details…** button.

Use the Audible Notification panel to enable playing of a wave file when the MC9190-G is dropped. Select a desired .wav file from the Sounds: drop-down list.

Motion Event Details

The **Motion Event Detail** list displays the date and time, duration and the type of the drop event. This event list can display up to last 32 motion events. A drop event is registered when the MC9190-G drops 1.07 m (42 in.) in normal operation and 1.27 m (50 in.) in suspend mode.

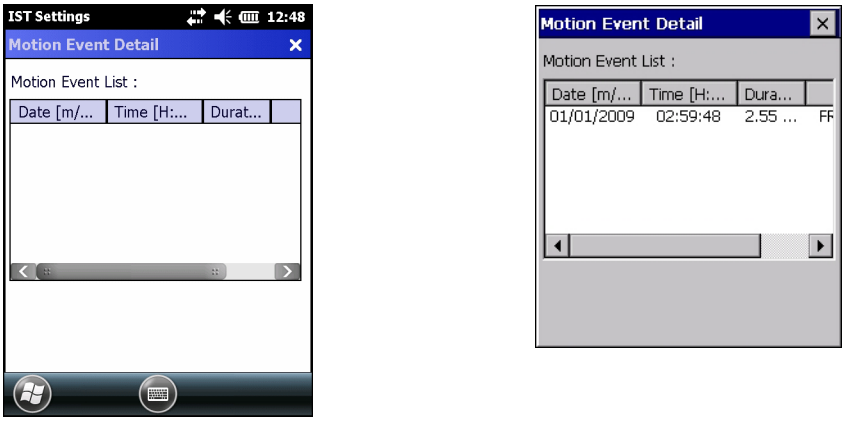


Figure 7-7 *Motion Event Detail Window*

Chapter 8 Maintenance & Troubleshooting

Introduction

This chapter includes instructions on cleaning and storing the MC9190-G, and provides troubleshooting solutions for potential problems during MC9190-G operating.

Maintaining the MC9190-G

For trouble-free service, observe the following tips when using the MC9190-G:

- Take care not to scratch the screen of the MC9190-G. When working with the MC9190-G, use the supplied stylus or plastic-tipped pens intended for use with a touch-sensitive screen. Never use an actual pen or pencil or other sharp object on the surface of the MC9190-G screen.
- Although the MC9190-G is water and dust resistant, do not expose it to rain or moisture for an extended period of time. In general, treat the MC9190-G as you would a pocket calculator or other small electronic instrument.
- The touch-sensitive screen of the MC9190-G contains glass. Take care not to drop the MC9190-G or subject it to strong impact.
- Protect the MC9190-G from temperature extremes. Do not leave it on the dashboard of a car on a hot day, and keep it away from heat sources.
- Do not store or use the MC9190-G in any location that is extremely dusty, damp or wet.
- Use a soft lens cloth to clean the MC9190-G. If the surface of the MC9190-G screen becomes soiled, clean it with a soft cloth moistened with a diluted window-cleaning solution.

Battery Safety Guidelines

- The area in which the units are charged should be clear of debris and combustible materials or chemicals. Particular care should be taken where the device is charged in a non commercial environment.
- Follow battery usage, storage, and charging guidelines found in the user's guide.
- Improper battery use may result in a fire, explosion, or other hazard.

- To charge the mobile device battery, the battery and charger temperatures must be between +32 ºF and +104 ºF (0 ºC and +40 ºC)
- Do not use incompatible batteries and chargers. Use of an incompatible battery or charger may present a risk of fire, explosion, leakage, or other hazard. If you have any questions about the compatibility of a battery or a charger, contact Motorola Enterprise Mobility support.
- For devices that utilize a USB port as a charging source, the device shall only be connected to products that bear the USB-IF logo or have completed the USB-IF compliance program.
- Do not disassemble or open, crush, bend or deform, puncture, or shred.
- Severe impact from dropping any battery-operated device on a hard surface could cause the battery to overheat.
- Do not short circuit a battery or allow metallic or conductive objects to contact the battery terminals.
- Do not modify or remanufacture, attempt to insert foreign objects into the battery, immerse or expose to water or other liquids, or expose to fire, explosion, or other hazard.
- Do not leave or store the equipment in or near areas that might get very hot, such as in a parked vehicle or near a radiator or other heat source. Do not place battery into a microwave oven or dryer.
- Battery usage by children should be supervised.
- Please follow local regulations to promptly dispose of used re-chargeable batteries.
- Do not dispose of batteries in fire.
- Seek medical advice immediately if a battery has been swallowed.
- In the event of a battery leak, do not allow the liquid to come in contact with the skin or eyes. If contact has been made, wash the affected area with large amounts of water and seek medical advice.
- If you suspect damage to your equipment or battery, contact Motorola Enterprise Mobility support to arrange for inspection.

Cleaning

CAUTION Always wear eye protection.

Read warning label on compressed air and alcohol product before using.

If you have to use any other solution for medical reasons please contact Motorola for more information.

WARNING! **Avoid exposing this product to contact with hot oil or other flammable liquids. If such exposure occurs, unplug the device and clean the product immediately in accordance with these guidelines.**

Approved Cleanser Active Ingredients

100% of the active ingredients in any cleaner must consist of one or some combination of the following: isopropyl alcohol, bleach/sodium hypochlorite, hydrogen peroxide or mild dish soap.

Harmful Ingredients

The following chemicals are known to damage the plastics on the MC9190-G and should not come in contact with the device: ammonia solutions, compounds of amines or ammonia; acetone; ketones; ethers; aromatic and chlorinated hydrocarbons; acqueous or alcoholic alkaline solutions; ethanolamine; toluene; trichloroethylene; benzene; carbolic acid and TB-lysoform.

Cleaning Instructions

Do not apply liquid directly to the MC9190-G. Dampen a soft cloth or use pre-moistened wipes. Do not wrap the device in the cloth or wipe, but gently wipe the unit. Be careful not to let liquid pool around the display window or other places. Allow the unit to air dry before use.

Special Cleaning Notes

Many vinyl gloves contain phthalate additives, which are often not recommended for medical use and are known to be harmful to the housing of the MC9190-G. The MC9190-G should not be handled while wearing vinyl gloves containing phthalates, or before hands are washed to remove contaminant residue after gloves are removed. If products containing any of the harmful ingredients listed above are used prior to handling the MC9190-G, such as hand sanitizer that contain ethanolamine, hands must be completely dry before handling the MC9190-G to prevent damage to the plastics.

Materials Required

- Alcohol wipes
- Lens tissue
- Cotton tipped applicators
- Isopropyl alcohol
- Can of compressed air with a tube.

Cleaning the MC9190-G

Housing

Using the alcohol wipes, wipe the housing including keys and in-between keys.

Display

The display can be wiped down with the alcohol wipes, but care should be taken not to allow any pooling of liquid around the edges of the display. Immediately dry the display with a soft, non-abrasive cloth to prevent streaking.

Scanner Exit Window

Wipe the scanner exit window periodically with a lens tissue or other material suitable for cleaning optical material such as eyeglasses.

Battery Contacts

1. Remove the battery from MC9190-G.
2. Dip the cotton portion of the cotton tipped applicator in isopropyl alcohol.

3. Rub the cotton portion of the cotton tipped applicator back-and-forth across the battery contacts on the back of the battery. Do not leave any cotton residue on the contacts.
4. Repeat at least three times.
5. Use the cotton tipped applicator dipped in alcohol to remove any grease and dirt near the contact area.
6. Use a dry cotton tipped applicator and repeat steps 3 through 5.
7. Spray compressed air on the contact area by pointing the tube/nozzle about ½ inch away from the surface. CAUTION: Do not point nozzle at yourself and others, ensure the nozzle or tube is away from your face.
8. Inspect the area for any grease or dirt, repeat if required.
9. Replace the battery in the MC9190-G.

Cleaning Cradle Connectors

To clean the connectors on a cradle:

1. Remove the DC power cable from the cradle.
2. Dip the cotton portion of the cotton tipped applicator in isopropyl alcohol.
3. Rub the cotton portion of the cotton tipped applicator along the pins of the connector(s). Slowly move the applicator back-and-forth from one side of the connector to the other. Do not let any cotton residue on the connector.
4. All sides of the connector should also be rubbed with the cotton tipped applicator.
5. Spray compressed air in the connector area by pointing the tube/nozzle about ½ inch away from the surface. CAUTION: do not point nozzle at yourself and others, ensure the nozzle or tube is pointed away from your face.
6. Ensure that there is no lint left by the cotton tipped applicator, remove lint if found.
7. If grease and other dirt can be found on other areas of the cradle, use lint free cloth and alcohol to remove.
8. Allow at least 10 to 30 minutes (depending on ambient temperature and humidity) for the alcohol to air dry before applying power to cradle.

   If the temperature is low and humidity is high, longer drying time is required. Warm temperature and dry humidity requires less drying time.

Cleaning Frequency

The cleaning frequency is up to the customer’s discretion due to the varied environments in which the mobile devices are used. They may be cleaned as frequently as required. However when used in dirty environments it may be advisable to periodically clean the scanner exit window to ensure optimum scanning performance.

Troubleshooting

MC9190-G

Table 8-1 *Troubleshooting the MC9190-G*

Problem	Cause	Solution
MC9190-G does not turn on.	Battery not charged.	Charge or replace the battery.
	Battery not installed properly.	Ensure battery is installed properly.
	System crash.	Perform a warm boot. If the MC9190-G still does not turn on, perform a cold boot. See *Resetting the MC9190-G on page 1-2*.
Rechargeable battery did not charge.	Battery failed.	Replace battery. If the MC9190-G still does not operate, try a warm boot, then a cold boot. See *Resetting the MC9190-G on page 1-2*.
	MC9190-G removed from cradle while battery was charging.	Insert MC9190-G in cradle and begin charging. The battery requires approximately four hours to recharge fully.
Cannot see characters on display.	MC9190-G not powered on.	Press the **Power** button.
During data communication, no data was transmitted, or transmitted data was incomplete.	MC9190-G removed from cradle or unplugged from host computer during communication.	Replace the MC9190-G in the cradle, or reattach the Synchronization cable and re-transmit.
	Incorrect cable configuration.	See the System Administrator.
	Communication software was incorrectly installed or configured.	Perform setup. See *Chapter 2, Accessories* for details.
		Ensure that Microsoft ActiveSync 4.5 or greater is installed on the host computer.
No sound is audible.	Volume setting is low or turned off.	Turn on or increase volume.

Table 8-1 *Troubleshooting the MC9190-G (Continued)*

Problem	Cause	Solution
MC9190-G turns itself off.	MC9190-G is inactive.	The MC9190-G turns off after a period of inactivity. If the MC9190-G is running on battery power, this period can be set to 30 sec., 1, 2, 3, 4, 5 or 6 minutes. If the MC9190-G is running on external power, this period can be set to 1, 2, 3, 5, 10, 15 and 30 minutes. For Windows Mobile 6.5 devices, Check the power settings by tapping **Start** > **Settings** > **System** > **Power** > **Advanced**. For WinCE 6.0 devices, Check the power settings by tapping **Start** > **Settings** > **Control Panel** > **Power** > **Advanced**. Change the setting if you need a longer delay before the automatic shutoff feature activates.
	Battery is depleted.	Replace the battery.
	Battery is not inserted properly.	Insert the battery properly.
Tapping the window buttons or icons does not activate the corresponding feature.	LCD screen not aligned correctly.	Re-calibrate the screen.
	The system is hung.	Warm boot the system. To perform a warm boot (see *Resetting the MC9190-G on page 1-2*).
A message appears stating that the MC9190-G memory is full.	Too many files stored on the MC9190-G.	Delete unused memos and records. You can save these records on the host computer.
	Too many applications installed on the MC9190-G.	If you have installed additional applications on the MC9190-G, remove them to recover memory. For Windows Mobile 6.5 devices, tap **Start** > **Settings** > **System** > **Remove Programs**. For WinCE 6.0 devices, tap **Start** > **Settings** > **Control Panel** > **Remove Programs**. Select the unused program and tap **Remove.**

Table 8-1 *Troubleshooting the MC9190-G (Continued)*

Problem	Cause	Solution
The MC9190-G does not accept scan input.	Scanning application is not loaded.	Verify that the MC9190-G is loaded with a scanning application. See the System Administrator.
	Unreadable bar code.	Ensure the symbol is not defaced.
	Distance between exit window and bar code is incorrect.	Ensure MC9190-G is within proper scanning range.
	MC9190-G is not programmed for the bar code.	Ensure the MC9190-G is programmed to accept the type of bar code being scanned.
	MC9190-G is not programmed to generate a beep.	If a beep on a good decode is expected and a beep is not heard, check that the application is set to generate a beep on good decode.
	Battery is low.	If the scanner stops emitting a laser beam when the trigger is pressed, check the battery level. When the battery is low, the scanner shuts off before the MC9190-G low battery condition notification. Note: If the scanner is still not reading symbols, contact the distributor or Motorola.

Bluetooth Connection

Table 8-2 *Troubleshooting Bluetooth Connection*

Problem	Cause	Solution
MC9190-G cannot find any Bluetooth devices nearby.	Too far from other Bluetooth devices.	Move closer to the other Bluetooth device(s), within a range of 10 meters (30 feet).
	The Bluetooth device(s) nearby are not turned on.	Turn on the Bluetooth device(s) you wish to find.
	The Bluetooth device(s) are not in discoverable mode.	Set the Bluetooth device(s) to discoverable mode. If needed, refer to the device's user documentation for help.
MC9190-G keeps powering down to protect memory contents.	The MC9190-G's battery is low.	Recharge the battery.
There is a delay in the Bluetooth stack re-initializing during a resume from suspend.	This is the normal behavior.	No solution required.

Four Slot Charge Only Cradle

Table 8-3 *Troubleshooting the Four Slot Charge Only Cradle*

Problem	Cause	Solution
MC9190-G charge indicator LED does not light.	Cradle is not receiving power.	Ensure the power supply is securely connected and receiving power.
	MC9190-G is not seated correctly in the cradle.	Ensure the battery is properly installed in the MC9190-G, and re-seat the MC9190-G in the cradle.
	The battery is not properly installed in the MC9190-G.	
	The battery in the MC9190-G is faulty.	Verify that other batteries charge properly. If so, replace the faulty battery.
Note: The Four Slot Charge Only Cradle has no power indication.		

Four Slot Ethernet Cradle

Table 8-4 *Troubleshooting the Four Slot Ethernet Cradle*

Symptom	Cause	Solution
Attempt by the MC9190-G to ActiveSync failed.	Cannot perform ActiveSync connection.	ActiveSync over an Ethernet connection is not available with Windows Mobile 6.5 or CE 6.0 and ActiveSync 4.5.
During communications, no data was transmitted, or transmitted data was incomplete.	MC9190-G removed from cradle during communications.	Replace MC9190-G in cradle and retransmit.
	MC9190-G has no active connection.	An icon will be visible in the status bar if a connection is currently active.
MC9190-G has successfully connected through the cradle, but no data is being transmitted over the connection.	Data is being transferred over the wireless link.	Temporarily disable the WLAN connection to force data transmission through the cradle. Once you have completed your data transmission, re-enable the WLAN connection.

Table 8-4 *Troubleshooting the Four Slot Ethernet Cradle (Continued)*

Symptom	Cause	Solution
All Communication Status LEDs are flashing red.	The cradle could not configure itself, or it has lost the lease on its IP address.	Connect the cradle to an Ethernet network with a correctly functioning DHCP server.
	Failed automatic cradle configuration via local DHCP service.	Connect a properly configured DHCP server or DHCP relay agent to the subnet, and power cycle the cradle. Check the DHCP server log to verify that the cradle is receiving a response to its DHCP request.
	The Ethernet link may be down.	Ensure the ethernet cable is connected to an active hub.
Communication Status LED does not light up.	MC9190-G has been inserted incorrectly into the cradle.	Remove, wait a minute, and then reinsert the MC9190-G, ensuring it fits snugly onto the connector at the bottom of the cradle.
	Cradle is not receiving power.	Ensure the power supply is securely connected and receiving power.
Battery is not recharging.	MC9190-G removed from the cradle too soon.	Replace the MC9190-G into the cradle. It can take up to four hours to recharge a completely depleted battery pack if MC9190-G is suspended or longer if the MC9190-G is on. For Windows Mobile 6.5 devices, view battery status by tapping **Start** > **Settings** > **System** > **Power**. For WinCE 6.0 devices, view battery status by tapping **Start** > **Settings** > **Control Panel** > **Power**.
	Battery is faulty.	Verify that other batteries charge properly. If so, replace the faulty battery.
	MC9190-G is not inserted correctly into the cradle.	Remove the MC9190-G and reinsert it correctly. Verify charging is active. For Windows Mobile 6.5 devices, view battery status by tapping **Start** > **Settings** > **System** > **Power**. For WinCE 6.0 devices, view battery status by tapping **Start** > **Settings** > **Control Panel** > **Power**.
Warning Message - "! Unable to obtain a server assigned IP address. Try again later or enter an IP address in Network Settings."	This message occurs if a suspend/resume cycle is performed and the MC9190-G radio is not associated (e.g. due to being out of range).	Tap **OK** to close the message. The MC9190-G will obtain address information and communicate through the ethernet cradle.

Four Slot Spare Battery Charger

Table 8-5 *Troubleshooting The Four Slot Spare Battery Charger*

Symptom	Possible Cause	Action
Batteries not charging.	Battery was removed from the charger or charger was unplugged from AC power too soon.	Ensure the charger is receiving power. Confirm main battery is charging. If a battery is fully depleted, it can take up to four hours to fully recharge a battery.
	Battery is faulty.	Verify that other batteries charge properly. If so, replace the faulty battery.
	Battery contacts not connected to charger.	Verify that the battery is seated in the battery well correctly with the contacts facing down.

Single Slot Serial/USB Cradle

Table 8-6 *Troubleshooting the Single Slot Serial/USB Cradle*

Symptom	Possible Cause	Action
LEDs do not light when MC9190-G or spare battery is inserted.	Cradle is not receiving power.	Ensure the power cable is connected securely to both the cradle and to AC power.
	MC9190-G is not seated firmly in the cradle.	Remove and re-insert the MC9190-G into the cradle, ensuring it is firmly seated.
	Spare battery is not seated firmly in the cradle.	Remove and re-insert the spare battery into the charging slot, ensuring it is firmly seated.
MC9190-G battery is not charging.	MC9190-G was removed from cradle or cradle was unplugged from AC power too soon.	Ensure cradle is receiving power. Ensure MC9190-G is seated correctly. Confirm that the battery is charging. If a MC9190-G battery is fully depleted, it can take up to four hours to fully recharge a battery (if the MC9190-G is off and longer if the MC9190-G is operating). For Windows Mobile 6.5 devices, view battery status by tapping **Start** > **Settings** > **System** tab > **Power**. For WinCE 6.0 devices, view battery status by tapping **Start** > **Settings** > **Control Panel** > **Power**.
	Battery is faulty.	Verify that other batteries charge properly. If so, replace the faulty battery.
	The MC9190-G is not fully seated in the cradle.	Remove and re-insert the MC9190-G into the cradle, ensuring it is firmly seated.

Table 8-6 *Troubleshooting the Single Slot Serial/USB Cradle (Continued)*

Symptom	Possible Cause	Action
Spare battery is not charging.	Battery not fully seated in charging slot.	Remove and re-insert the spare battery into the cradle, ensuring it is firmly seated.
	Battery inserted incorrectly.	Ensure the contacts are facing down and toward the back of the cradle.
	Battery is faulty.	Verify that other batteries charge properly. If so, replace the faulty battery.
During data communications, no data was transmitted, or transmitted data was incomplete.	MC9190-G removed from cradle during communications.	Replace MC9190-G in cradle and retransmit.
	Incorrect cable configuration.	See the System Administrator.
	Communications software is not installed or configured properly.	Perform setup as described in *Chapter 2, Accessories*.
		Ensure that Microsoft ActiveSync 4.5 or greater is installed on the host computer.

Cable Adapter Module

Table 8-7 *Troubleshooting The Cable Adapter Module*

Symptom	Possible Cause	Action
MC9190-G battery is not charging.	MC9190-G was removed from CAM or CAM was unplugged from AC power too soon.	Ensure CAM is receiving power. Ensure MC9190-G is attached correctly. Confirm that the battery is charging. If a MC9190-G battery is fully depleted, it can take up to four hours to fully recharge a battery (if the MC9190-G is off and longer if the MC9190-G is operating). For Windows Mobile 6.5 devices, view battery status by tapping **Start** > **Settings** > **System** > **Power**. For WinCE 6.0 devices, view battery status by tapping **Start** > **Settings** > **Control Panel** > **Power**.
	Battery is faulty.	Verify that other batteries charge properly. If so, replace the faulty battery.
	The MC9190-G is not fully attached to the CAM.	Detach and re-attach the CAM to the MC9190-G, ensuring it is firmly connected.

Table 8-7 *Troubleshooting The Cable Adapter Module (Continued)*

Symptom	Possible Cause	Action
During data communications, no data was transmitted, or transmitted data was incomplete.	MC9190-G detached from CAM during communications.	Re-attach MC9190-G to CAM and retransmit.
	Incorrect cable configuration.	See the System Administrator.
	Communications software is not installed or configured properly.	Perform setup as described in *Chapter 2, Accessories*.

Magnetic Stripe Reader

Table 8-8 *Troubleshooting the Magnetic Stripe Reader*

Symptom	Possible Cause	Action
MSR cannot read card.	MC9190-G detached from MSR during card swipe.	Re-attach MC9190-G to MSR and reswipe the card.
	Faulty magnetic stripe on card.	See the System Administrator.
	MSR application is not installed or configured properly.	Ensure the MSR application is installed on the MC9190-G. Ensure the MSR application is configured correctly.
MC9190-G battery is not charging.	MC9190-G was removed from MSR or MSR was unplugged from AC power too soon.	Ensure MSR is receiving power. Ensure MC9190-G is attached correctly. Confirm that the battery is charging. If a MC9190-G battery is fully depleted, it can take up to four hours to fully recharge a battery (if the MC9190-G is off and longer if the MC9190-G is operating). For Windows Mobile 6.5 devices, view battery status by tapping **Start** > **Settings** > **System** > **Power**. For WinCE 6.0 devices, view battery status by tapping **Start** > **Settings** > **Control Panel** > **Power**.
	Battery is faulty.	Verify that other batteries charge properly. If so, replace the faulty battery.
	The MC9190-G is not fully attached to the MSR.	Detach and re-attach the MSR to the MC9190-G, ensuring it is firmly connected.

Table 8-8 *Troubleshooting the Magnetic Stripe Reader (Continued)*

Symptom	Possible Cause	Action
During data communications, no data was transmitted, or transmitted data was incomplete.	MC9190-G detached from MSR during communications.	Reattach MC9190-G to MSR and retransmit.
	Incorrect cable configuration.	See the System Administrator.
	Communications software is not installed or configured properly.	Perform setup as described in *Chapter 2, Accessories*.

Modem Module

Table 8-9 *Troubleshooting the Modem Module*

Symptom	Possible Cause	Action
MC9190-G is not communicating through the modem.	The modem cable is not fully connected.	Connect the modem cable securely to both the modem and the telephone jack.
	Modem is not securely connected to the MC9190-G.	Reconnect the modem firmly to the MC9190-G.
	Communication software is not installed or configured properly.	Set up the communication software as described in *Chapter 2, Accessories*.
	Problem in the telephone lines.	Connect a conventional telephone and dial the remote modem to verify the telephone lines are functioning. If the remote modem does not answer the call and emit answering tones, contact the remote System Administrator.
	MC9190-G's battery is low or discharged, which shuts off power to the modem.	Install a charged battery in the MC9190-G, or use an external DC power adapter to recharge the battery.

Table 8-9 *Troubleshooting the Modem Module (Continued)*

Symptom	Possible Cause	Action
ActiveSync fails.	A partnership was not established with the host computer.	Establish a partnership with the host computer (see *Chapter 2, Accessories*).
	Host computer is not selected in the **ActiveSync** window on the MC9190-G.	Select a host computer in the **ActiveSync** window, and perform setup (see *Chapter 2, Accessories*).
	Modem RAS connection not allowed by host computer.	Select RAS connection in the host computer (**File** > **Connection Settings** window). Refer to the ReadMe files located in the Microsoft ActiveSync folder on the host computer.
	MC9190-G or modem was disconnected from the telephone line while ActiveSync was in progress.	Disconnect the modem cable for 30 seconds to hang up the local telephone connection. Close any open windows on the MC9190-G and any modem connections.
	Synchronization occurred, but the session is configured to close immediately after synchronization is complete.	Verify the setting of the **When manually synchronizing disconnect when complete** checkbox by tapping **Start** > **ActiveSync** > **Menu** > **Options** > **Schedule** tab.
Dial-out fails	Location setting is incorrect.	Verify Dialing Locations. Verify Dialing Patterns are correct for the current location. For example, enter ‘G’ in the *For local calls, dial:* field to dial directly, or ‘9,G’ if the telephone system requires dialing ‘9’ first to access an outside line.
	Incorrect server phone number.	Verify the connection phone number in the **Connecting** window.
	Pulse dialing not supported for country.	Use a connection within a tone-dialing system.
	The Connection Manager routes are incorrect.	Warm boot the MC9190-G and confirm the connection settings.

Appendix A Technical Specifications

MC9190-G Specifications

The following table summarizes the MC9190-G's technical specifications.

Table A-1 *Technical Specifications*

Item	Description
Physical and Environmental Characteristics	
Dimensions	9.1 in. L x 3.6 in. W x 7.6 in. H 23.1 cm L x 9.1 cm H x 19.3 cm H
Weight (includes battery, scanner and radio)	709 g (25 oz.)
Keyboard	28-key; 43-key; 53-key; Terminal Emulation (5250, 3270, VT)
Display	3.7 in. color. Windows Mobile: VGA; Windows CE: QVGA/VGA switchable.
Power	Removable, rechargeable 7.2 V Lithium Ion 2200 mAh battery pack, 15.8 watt hours
Performance Characteristics	
CPU	Marvell PXA320 processor at 806 MHz
Operating System	Microsoft Windows CE 6.0 or Windows Mobile 6.5 Classic
Memory	256 MB RAM/1 GB FLASH
Expansion	SD Card
Application Development	PSDK and EMDK available through Motorola Support Central Web site.

Table A-1 *Technical Specifications (Continued)*

Item	Description
Data Capture Options	**SE960:** 1D standard range scan engine. **SE1524-ER:** 1D extended range scan engine reads up to 45 ft./13.72 m away. **SE4500-SR:** Omnidirectional 1D/2D imaging engine reads 1D and 2D symbols. **SE4500-DL:** 1D/2D DL imaging engine reads all 1D and 2D codes as well as the PDF codes found on driver's licenses and other identification documents. **SE4500-HD:** 1D/2D DPM imaging engine reads a wide variety of DPM marks on metal, plastic and glass surfaces, including: dot peening, laser etching, molding, stamping or casting. **SE4600:** Extended range omnidirectional 1D/2D imaging engine reads 1D and 2D symbols as close as 8 in./20.32 cm and as far as 30 ft./9.14 m.
User Environment	
Operating Temperature	-4°F to 122°F (-20°C to 50°C)
Storage Temperature	-25°F to 160°F (-40°C to 70°C)
Battery Charging Temperature	32 °F to 104 °F (0 °C to +40 °C)
Humidity	5% to 95% non condensing
Drop Specification	Multiple drops to concrete: 6 ft./1.8 m across the operating temperature range; meets and exceeds MIL-STD 810G
Tumble	2,000 one-meter tumbles at room temperature (4,000 hits)
Environmental Sealing	IP64 (electronic enclosure, display and keypad)
ESD	+/-15kVdc air discharge +/-8kVdc direct discharge +/-8kVdc indirect discharge

Table A-1 *Technical Specifications (Continued)*

Item	Description
WLAN Wireless Data Communications	
WLAN radio	802.11a/b/g. Note: 802.11a not available in Thailand.
Output Power	100mW U.S. and International
Data Rate	802.11a: up to 54Mb per second 802.11b: up to 11Mb per second 802.11g: up to 54Mb per second
Frequency Range	All country dependent: 802.11a - 5 GHz; 802.11b – 2.4 GHz; 802.11g – 2.4 GHz
Antenna	Internal
WPAN Wireless Data Communications	
Bluetooth	Bluetooth Version 2.1 with EDR
Peripherals and Accessories	
Cradles	Single-slot serial/USB, 4-slot Ethernet and 4-slot charge only
Printers	Supports extensive line of Motorola approved printers and cables
Charger	4-Slot universal battery charger, 4-slot battery charger
Other Accessories	Cable Adapter Module; snap-on Magnetic Stripe Reader; Modem module; full set of holsters; full set of cables

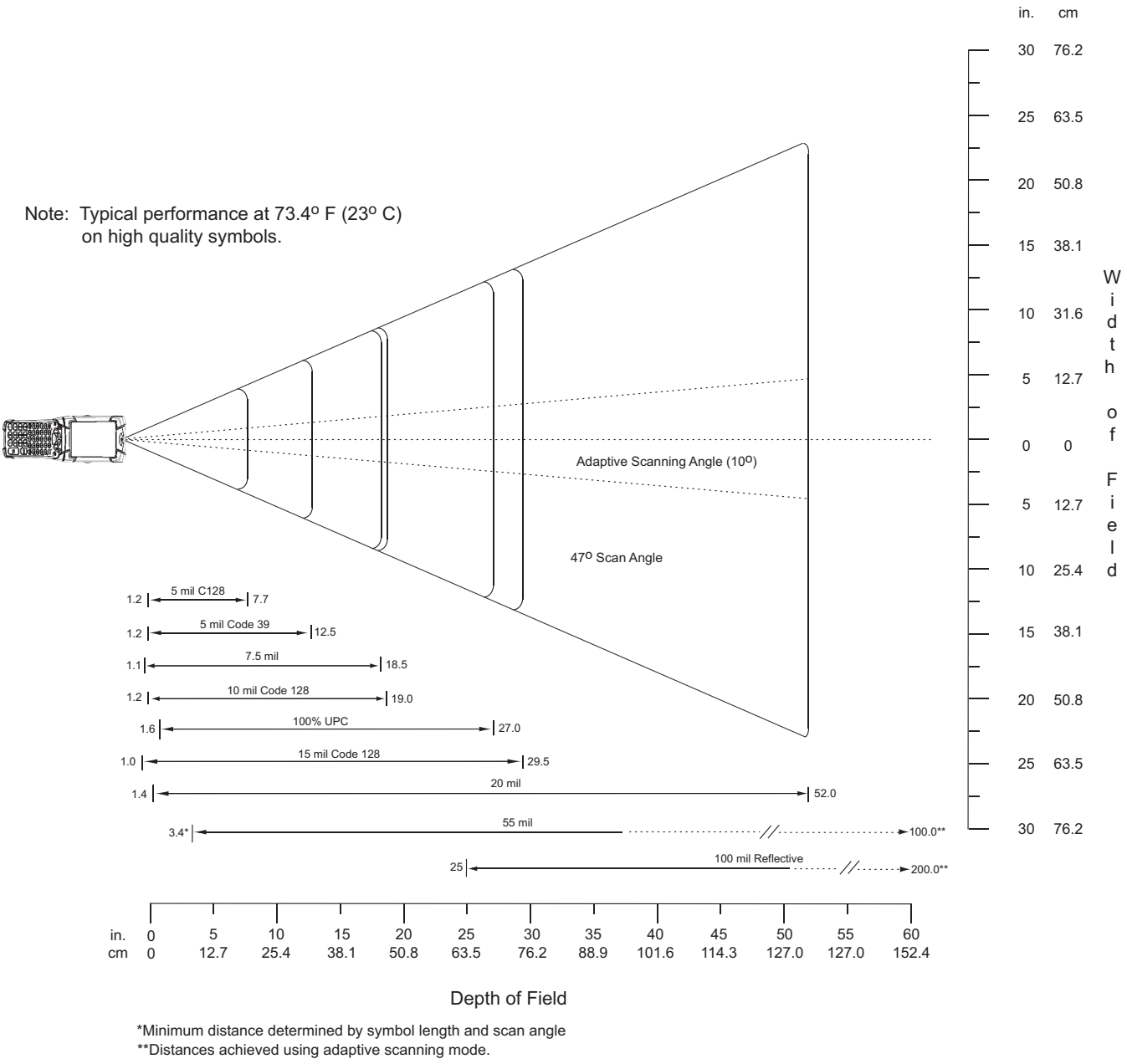
Table A-2 *Data Capture Options*

Item	Description		
Laser Decode Capability	Code 39 Codabar Interleaved 2 of 5 MSI UPC/EAN supplementals Webcode RSS Expanded Chinese 2 of 5	Code 128 Code 11 EAN-8 UPCA Coupon Code RSS-14	Code 93 Discrete 2 of 5 EAN-13 UPCE Trioptic 39 RSS Limited
Imaging Decode Capability	Code 39 Codabar Discrete 2 of 5 EAN-13 UPC/EAN supplementals Webcode Composite C Macro PDF-417 RSS Expanded Data Matrix US Planet Canadian 4-state Chinese 2 of 5 microQR	Code 128 Code 11 MSI UPCA Coupon Code TLC39 Micro PDF-417 (Macro) Micro PDF-417 RSS Limited Maxi Code UK 4-state Japanese 4-state USPS 4-state (US4CB)	Code 93 Interleaved 2 of 5 EAN-8 UPCE Trioptic 39 Composite AB PDF-417 QR Code RSS-14 US Postnet Australian 4-state Dutch Kix Aztec

Decode Zones

SE960 Standard Range Laser Decode Zones

Figure A-1 shows the decode zone for the SE960 scan engine. The figures are typical values. *Table A-3* lists the typical distances for selected bar code densities. The minimum element width (or “symbol density”) is the width in mils of the narrowest element (bar or space) in the symbol.



*Minimum distance determined by symbol length and scan angle
**Distances achieved using adaptive scanning mode.

Figure A-1 *SE960 Decode Zone*

Table A-3 *SE960 Decode Distances*

Symbol Density/ Bar Code Type/ W-N Ratio	Bar Code Content/ Contrast[Note 1]	Typical Working Ranges	
		Near	Far
5.0 mil Code 128	1234 80% MRD	1.2 in 3.05 cm	7.7 in 19.56 cm
5.0 mil Code 39; 2.5:1	ABCDEFGH 80% MRD	1.2 in 3.05 cm	12.5 in 31.75 cm
7.5 mil Code 39; 2.5:1	ABCDEF 80% MRD	1.1 in 2.79 cm	18.5 in 46.99 cm
10 mil Code 128	1234 80% MRD	1.2 in 3.05 cm Note 3	19.0 in 48.26 cm
13 mil 100% UPC	12345678905 80% MRD	1.6 in 4.06 cm	27.0 in 68.58 cm
15 mil Code 128	1234 80% MRD	1.0 in 2.54 cm Note 3	29.5 in 74.93 cm
20 mil Code 39; 2.2:1	123 80% MRD	1.4 in 3.56 cm Note 3	52.0 in 132.08 cm
55 mil Code 39; 2.2:1	CD 80% MRD	3.4 in 8.64 cm Note 3	100.0 in 254.00 cm
100 mil Code 39; 3.0:1 reflective	123456 80% MRD	2 ft 60.96cm Note 3	17 ft 518.16 cm

Notes:

1. Contrast measured as Mean Reflective Difference (MRD) at 650 nm.
2. Working range specifications at ambient temperature (23°C), photographic quality symbols. Pitch=10°, roll=0°, skew=0°, ambient light < 150 ft-candles using Symbol or equivalent decoder.
3. Dependent on width of bar code.
4. Distances measured from front edge of scan engine chassis.

SE1524 Long Range Laser Decode Zones

Typical decode ranges are shown in *Figure A-2*. *Table A-4 on page A-8* lists the typical distances for the SE1524 for selected bar code densities. The minimum element width (or “symbol density”) is the width in mils of the narrowest element (bar or space) in the symbol. The maximum usable length of a symbol at any given range is shown.

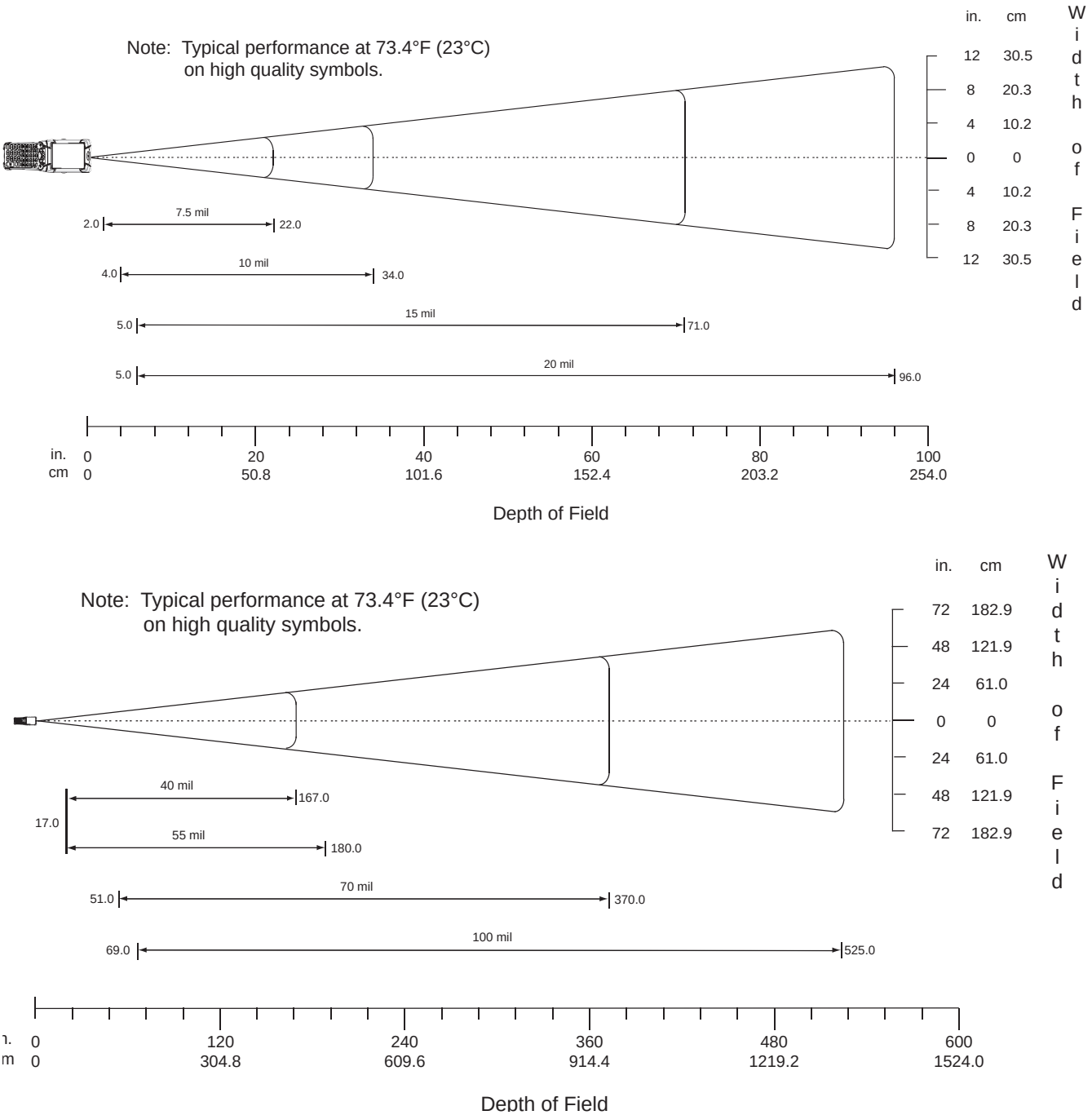


Figure A-2 *SE1524Decode Zones*

Table A-4 *SE 1524 Decode Distances*

Symbol Density/ p/n / Bar Code Type/ W-N Ratio	Bar Code Content/ Contrast[Note 1]	Typical Working Ranges	
		Near	Far
7.5 mil 64-17452-01 Code 39; 2.5:1	ABCDEF 80% MRD	2.0 in 5.08 cm	22.0 in 55.88 cm
10 mil 64-17454-01 Code 39; 2.5:1	ABCDE 80% MRD	4.0 in 10.16 cm	34.0 in 86.36 cm
15 mil 64-17417-01 Code 39; 2.5:1	ABCD 80% MRD	5.0 in 12.70 cm	71.0 in 180.34cm
20 mil 64-17456-01 Code 39; 2.2:1	123 80% MRD	5.0 in 12.70 cm	96.0 in 243.84 cm
55 mil 64-17458-01 Code 39; 2.2:1	CD 80% MRD	15.0 in 38.10 cm	180.0 in 457.20 cm
70 mil reflective 64-08780-01 Code 39; 3:1	123477 Reflective 80% MRD	Note 4	367.0 in 932.18 cm
100 mil reflective 64-16990-01 Code 39; 3:1	123456 Reflective 80% MRD	Note 4	542.0 in 1376.68 cm

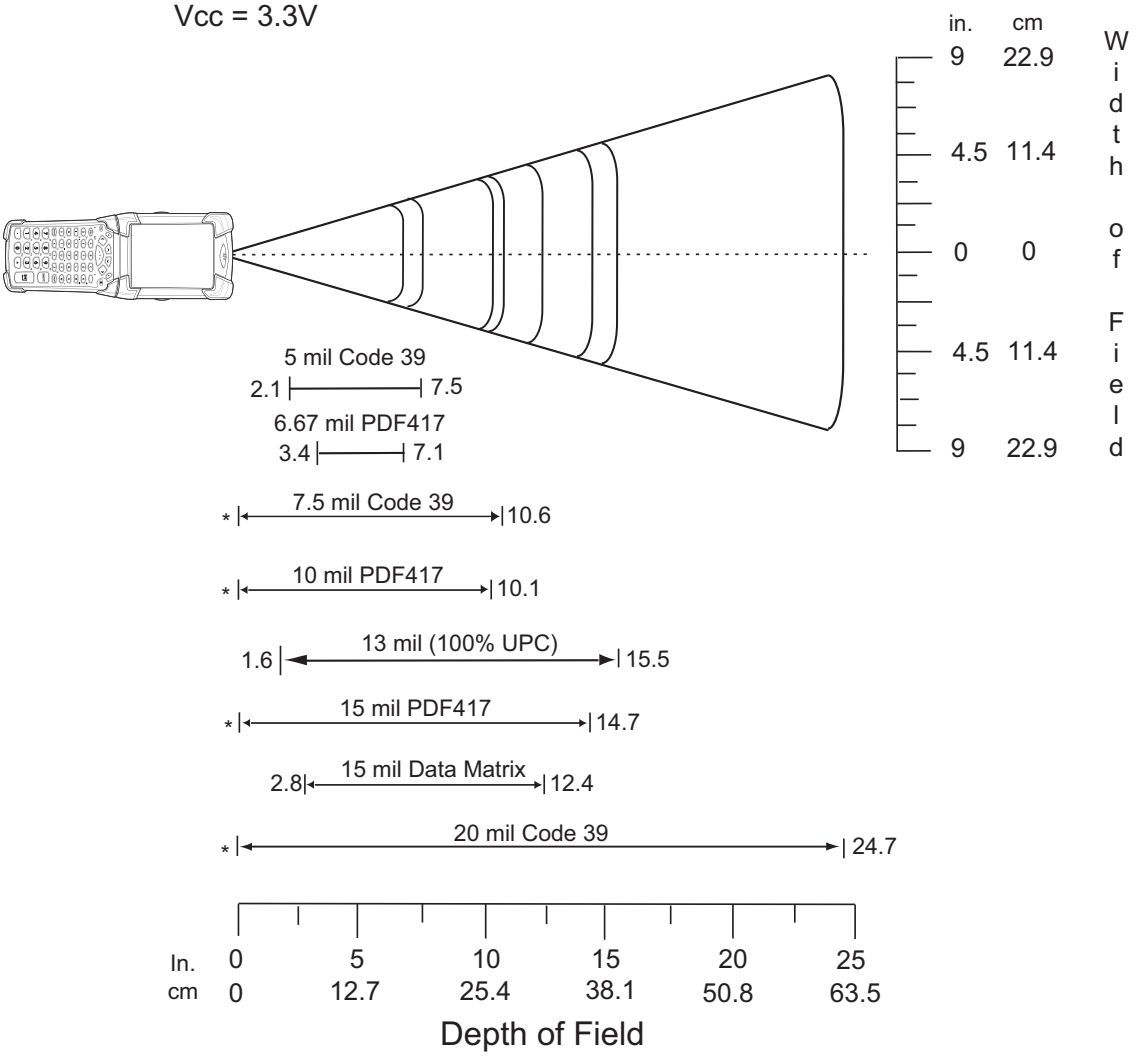
Notes:
1. CONTRAST measured as Mean Reflective Difference (MRD) at 670 nm.
2. Near ranges are largely dependent upon the width of the bar code.
3. Working range specifications at temperature 23 °C.
4. Near range on reflective bar codes determined by degree of reflectivity and width of bar code.

SE4500 Standard Range Imager Decode Zones

SE4500-SR

Figure A-3 shows the decode zone for the SE4500-SR. Typical values appear. *Table A-3* lists the typical distances for selected bar code densities. The minimum element width (or “symbol density”) is the width in mils of the narrowest element (bar or space) in the symbol.

Note: Typical performance at 73˚F (23˚C)
on high quality symbols in normal room light.
Vcc = 3.3V



* Minimum distance determined by symbol length and scan angle.

Figure A-3 *SE4500-SR Decode Zone*

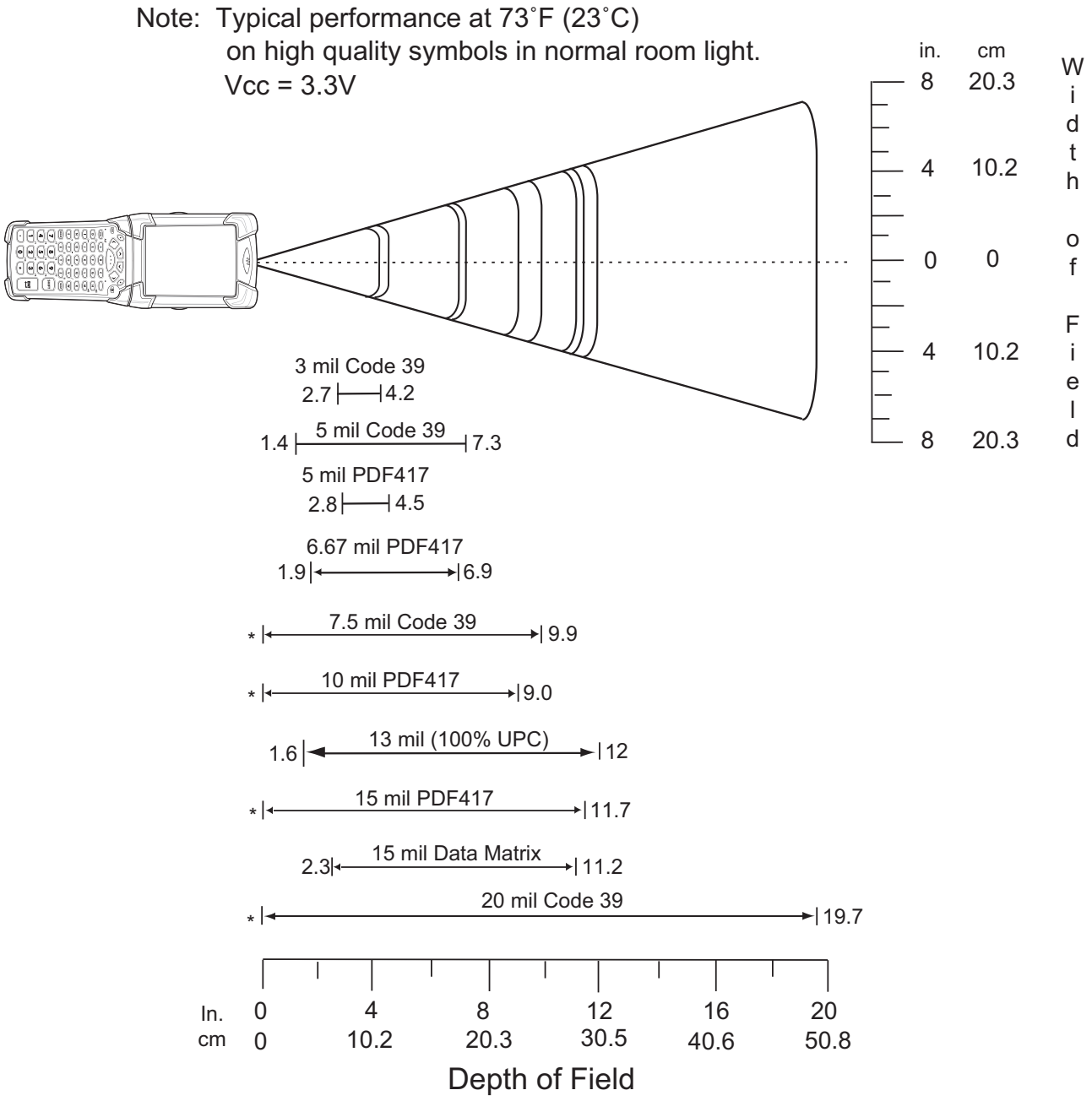
Table A-5 *SE4500-SR Decode Distances*

Symbol Density/ Bar Code Type	Bar Code Content/ Contrast[Note 2]	Typical Working Ranges	
		Near	Far
5.0 mil Code 39	ABCDEFGH 80% MRD	2.1 in 5.33 cm	7.5 in 19.05 cm
6.67 mil PDF417	4 Col, 20 Rows 80% MRD	3.4 in 8.64 cm	7.1 in 18.03 cm
7.5 mil Code 39	ABCDEF 80% MRD	Note 1	10.6 in 26.92 cm
10 mil PDF417	3 Col, 17 Rows 80% MRD	Note 1	10.1 in 25.65 cm
13 mil UPC-A	012345678905 80% MRD	1.6 in 5.08 cm	15.5 in 39.37 cm
15 mil PDF417	80% MRD	Note 1	14.7 in 37.34 cm
15 mil Data Matrix	18 x 18 Modules 80% MRD	2.8 in 7.11 cm	12.4 in 31.50 cm
20 mil Code 39	123 80% MRD	Note 1	24.7 in 62.74 cm

Notes:
1. Near distances are field-of-view (FOV) limited.
2. Contrast is measured as Mean Reflective Difference (MRD) at 670 nm.
3. Working range specifications at temperature = 23°C, pitch=18°, roll=0°, skew=0°, photographic quality, ambient light ~30 ft-c, humidity 45-70% RH.
4. Distances measured from front edge of scan engine chassis.

SE4500-DL

Figure A-4 shows the decode zone for the SE4500-DL. Typical values appear. *Table A-6* lists the typical distances for selected bar code densities. The minimum element width (or “symbol density”) is the width in mils of the narrowest element (bar or space) in the symbol.



* Minimum distance determined by symbol length and scan angle.

Figure A-4 *SE4500-DL Decode Zone*

Table A-6 *SE4500-DL Decode Distances*

Symbol Density/ Bar Code Type	Bar Code Content/ Contrast[Note 2]	Typical Working Ranges	
		Near	Far
3.0 mil Code 39	80% MRD	2.7 in 6.86 cm	4.2 in 10.67 cm
5.0 mil Code 39	ABCDEFGH 80% MRD	1.4 in 3.56 cm	7.3 in 18.54 cm
5.0 mil PDF417	80% MRD	2.8 in 7.11 cm	4.5 in 11.43 cm
6.67 mil PDF417	4 Col, 20 Rows 80% MRD	1.9 in 4.83 cm	6.9 in 17.53 cm
7.5 mil Code 39	ABCDEF 80% MRD	Note 1	9.9 in 25.15 cm
10 mil PDF417	3 Col, 17 Rows 80% MRD	Note 1	9.0 in 22.86 cm
13 mil UPC-A	012345678905 80% MRD	1.6 in 5.08 cm	12.0 in 30.48 cm
15 mil PDF417	80% MRD	Note 1	11.7 in 29.72 cm
15 mil Data Matrix	18 x 18 Modules 80% MRD	2.3 in 5.84 cm	11.2 in 28.45 cm
20 mil Code 39	123 80% MRD	Note 1	19.7 in 50.04 cm

Notes:
1. Near distances are FOV limited.
2. Contrast is measured as Mean Reflective Difference (MRD) at 670 nm.
3. Working range specifications at temperature = 23°C, pitch=18°, roll=0°, skew=0°, photographic quality, ambient light ~30 ft-c, humidity 45-70%RH.
4. Distances measured from front edge of scan engine chassis.

SE4500-HD

Figure A-5 shows the decode zone for the SE4500-HD. Typical values appear. *Table A-7* lists the typical distances for selected bar code densities. The minimum element width (or “symbol density”) is the width in mils of the narrowest element (bar or space) in the symbol.

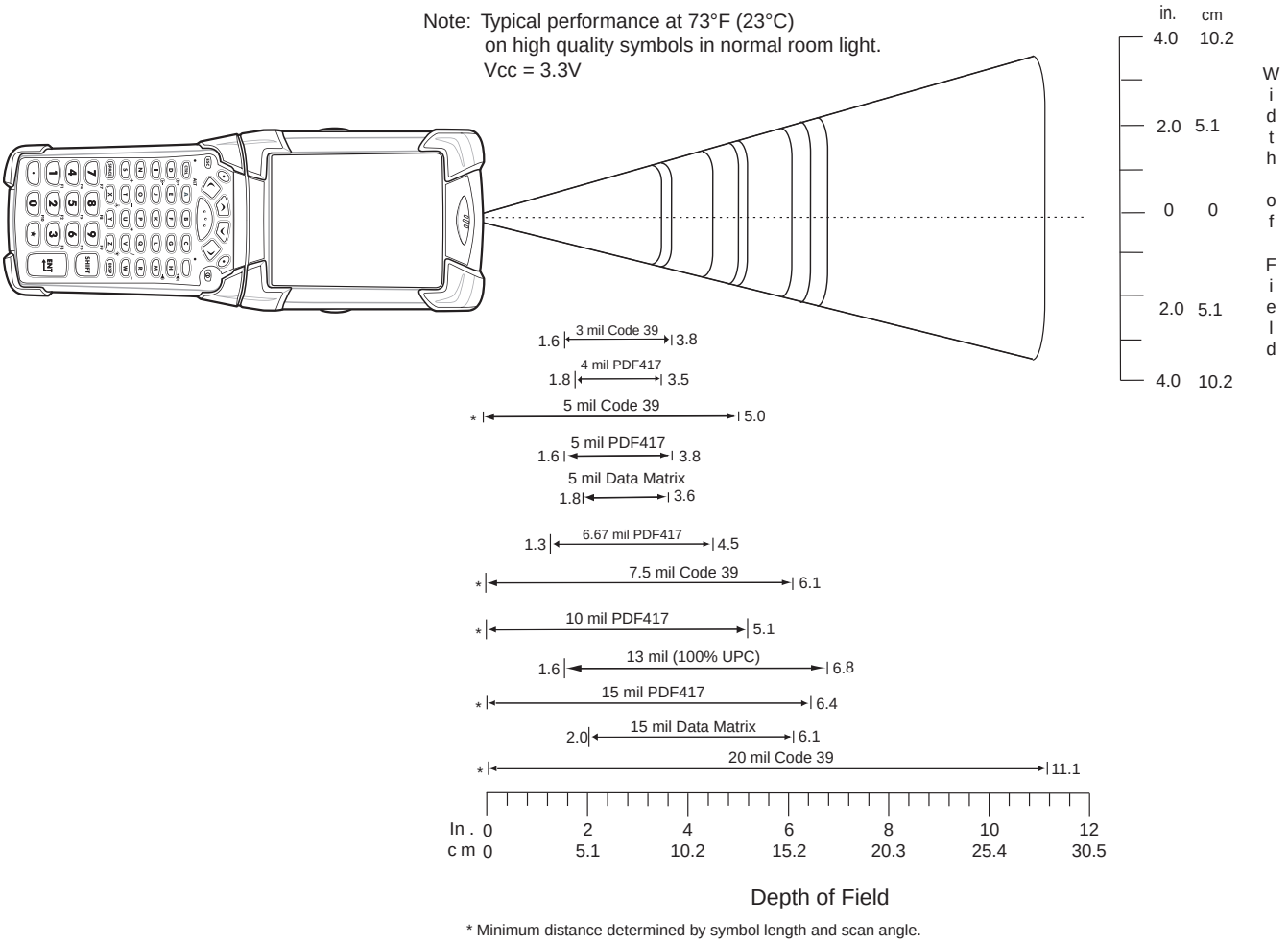


Figure A-5 *SE4500-HD Decode Zone*

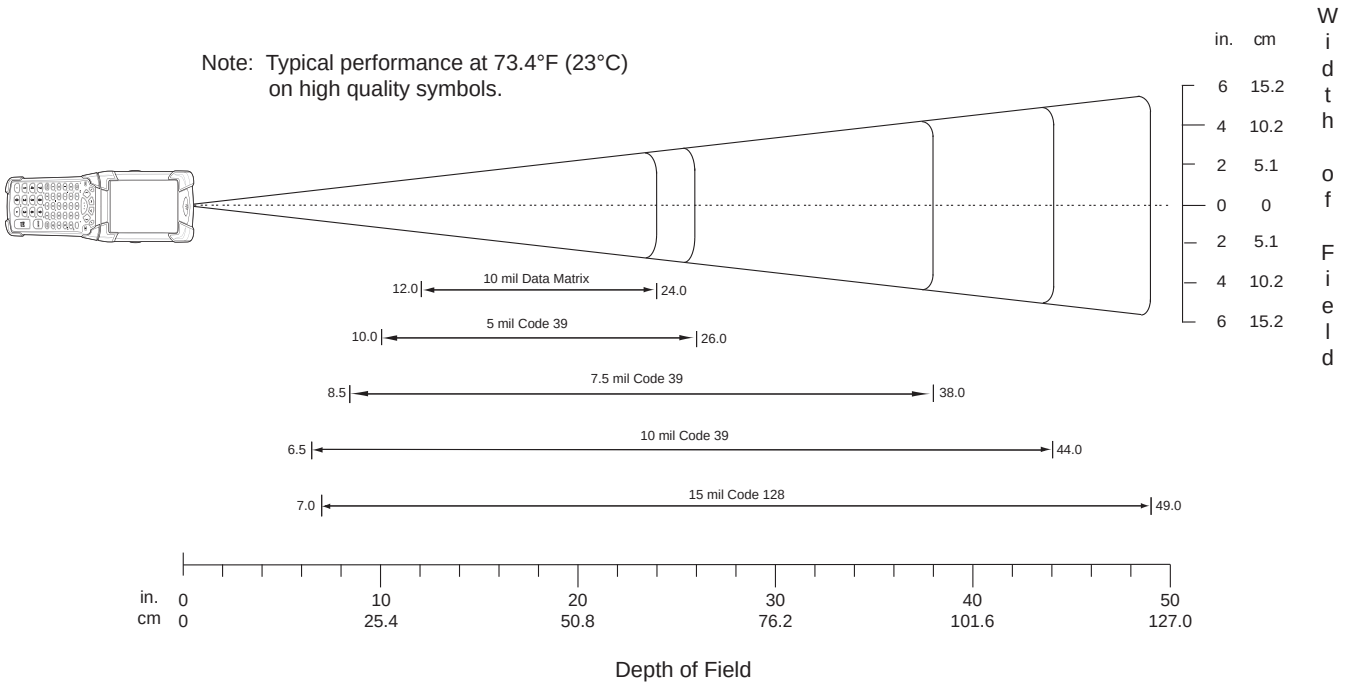
Table A-7 *SE4500-HD Decode Distances*

Symbol Density/ Bar Code Type	Bar Code Content/ Contrast[Note 2]	Typical Working Ranges	
		Near	Far
3.0 mil Code 39	80% MRD	1.6 in 4.06 cm	3.8 in 9.65 cm
4.0 mil PDF417	80% MRD	1.8 in 4.57 cm	3.5 in 8.89 cm
5.0 mil Code 39	ABCDEFGH 80% MRD	Note 1	5.0 in 12.70 cm
5.0 mil PDF417	80% MRD	1.6 in 4.06 cm	3.8 in 9.65 cm
5 mil Data Matrix	18 x 18 Modules 80% MRD	1.8 in 4.57 cm	3.6 in 9.15 cm
6.67 mil PDF417	4 Col, 20 Rows 80% MRD	1.3 in 3.30 cm	4.5 in 11.43 cm
7.5 mil Code 39	ABCDEF 80% MRD	Note 1	6.1 in 15.49 cm
10 mil PDF417	3 Col, 17 Rows 80% MRD	Note 1	5.1 in 12.95 cm
13 mil UPC-A	012345678905 80% MRD	1.6 in 4.06 cm	6.8 in 17.27 cm
15 mil PDF417	80% MRD	Note 1	6.4 in 16.26 cm
15 mil Data Matrix	18 x 18 Modules 80% MRD	2.0 in 5.08 cm	6.1 in 15.49 cm
20.0 mil Code 39	123 80% MRD	Note 1	11.1 in 28.19 cm

Notes:
1. Near distances are FOV limited.
2. Contrast is measured as Mean Reflective Difference (MRD) at 670 nm.
3. Working range specifications at temperature = 23°C, pitch=18°, roll=0°, skew=0°, photographic quality, ambient light ~30 ft-c, humidity 45-70% RH.
4. Distances measured from front edge of scan engine chassis.

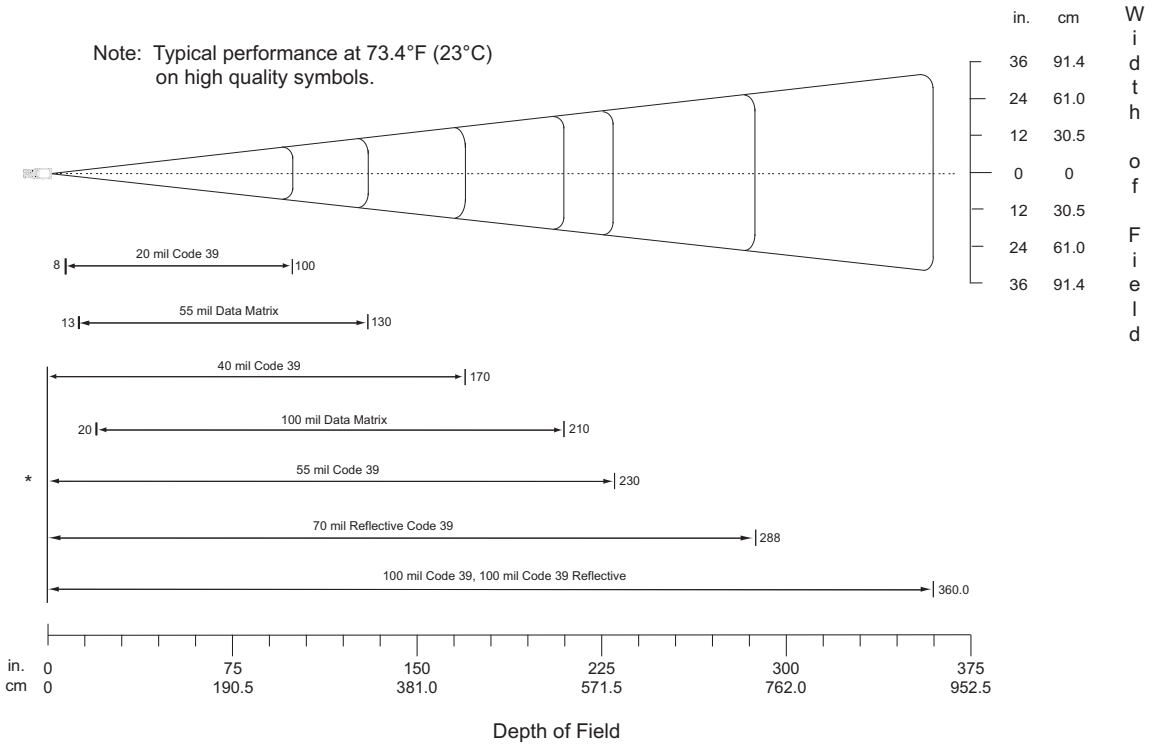
SE4600 Long Range Imager Decode Zones

Figure A-6 and *Figure A-7* show the decode zones for the SE4600 scan engine. The figures are typical values. *Table A-8* lists the typical distances for selected bar code densities. The minimum element width (or “symbol density”) is the width in mils of the narrowest element (bar or space) in the symbol.



Notes:
Bar code width = 10.9 in. @ 49 in. depth of field.
Total readable bar code width is 2x the width appearing at the top or bottom of the Width of Field scale.

Figure A-6 *SE4600 Decode Zone - Near Ranges*



* Near range determined by degree of reflectivity and width of bar code.

Notes:
Bar code width = 72.8 in. @ 360 in. depth of field.
Total readable bar code width is 2x the width appearing at the top or bottom of the Width of Field scale.

Figure A-7 *SE4600 Decode Zone - Far Ranges*

Table A-8 *SE4600 Decode Distances*

Symbology	Bar Code Content/ Contrast	Typical Working Range @ 25 Ft-cd Minimum	
		Near	Far
5 mil Code 39	ABCDEFGH MRD=80%	10 in. 25.4 cm	26 in. 66.0 cm
7.5 mil Code 39	ABCDEF MRD=80%	8.5 in. 21.6 cm	38 in. 96.5 cm
10 mil Code 39 (Note 2)	ABCDE MRD=80%	6.5 in. 165.1 cm	44 in. 111.8 cm
15 mil Code 128	1234 MRD=80%	7 in. 17.8 cm	49 in. 124.5
20 mil Code 39	123 MRD=80%	8 in. 20.3 cm	100 in. 254.0 cm
40 mil Code 39	AB MRD=80%	22 in.(Note 8) 55.9 cm	170 in. 431.8 cm
55 mil Code 39	CD MRD=80%	26 in.(Note 8) 66.0 cm	230 in. 584.2 cm
100 mil Code 39	12 3:1 MRD=80%	30 in.(Note 8) 76.2 cm	360 in. 914.4 cm
70 mil Reflective Code 39 (Note 4)	123469	46 in.(Note 8) 116.8 cm	288 in. 731.5 cm
100 mil Reflective Code 39 (Note 4)	1234	50 in.(Note 8) 127 cm	360 in. 914.4 cm

Notes:
1. At 23^{o} C.
2. 6.5 inches achievable with near LED (on the right when facing the front of the engine) on and far LED off.
3. Test bar codes with 2 internal LEDs flashing with 1.2A peak current, at ambient light of minimum 25 foot-candle in the plane of the bar code.
4. Mount reflective bar codes on white or black background with minimum 4" border. Luminance in the line-of-sight direction should be 50-120 cd/mm^2. Ensure there is no extraneous illumination or shadow on the bar code and that it is centered within the aiming pattern.
5. Reading criteria: 3 successful decodes out of 4 consecutive frames after setting autoexposure.
6. Provide a baffle if needed to prevent stray light from getting into the sensor fields of view.
7. Distances are measured from the front face of the scan engine chassis.
8. Near range may be closer with shorter bar codes.
9. Dependent on length of bar codes.

Table A-8 *SE4600 Decode Distances (Continued)*

Symbology	Bar Code Content/ Contrast	Typical Working Range @ 25 Ft-cd Minimum	
		Near	Far
Data Matrix 10 mil	01234567890123450000 MRD=80%	12 in. 30.5 cm	24 in. 61.0 cm
Data Matrix 55 mil	123456789 MRD=80%	13 in. 33.0 cm	130 in. 330.2 cm
Data Matrix 100 mil	123456789 MRD=80%	20 in. 50.8 cm	210 in. 533.4 cm

Notes:
1. At 23° C.
2. 6.5 inches achievable with near LED (on the right when facing the front of the engine) on and far LED off.
3. Test bar codes with 2 internal LEDs flashing with 1.2A peak current, at ambient light of minimum 25 foot-candle in the plane of the bar code.
4. Mount reflective bar codes on white or black background with minimum 4" border. Luminance in the line-of-sight direction should be 50-120 cd/mm^2. Ensure there is no extraneous illumination or shadow on the bar code and that it is centered within the aiming pattern.
5. Reading criteria: 3 successful decodes out of 4 consecutive frames after setting autoexposure.
6. Provide a baffle if needed to prevent stray light from getting into the sensor fields of view.
7. Distances are measured from the front face of the scan engine chassis.
8. Near range may be closer with shorter bar codes.
9. Dependent on length of bar codes.

Mobile Computer Pin-Outs

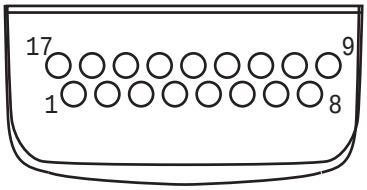


Figure A-8 *Pin Locations*

Table A-9 *Pin-Outs*

PIN Number	Signal Name	Function
1	USB_GND	USB
2	USB_D_PLUS	USB
3	TXD	RS232C
4	RXD	RS232C
5	DCD	RS232C
6	RTS	RS232C
7	DSR	RS232C

Table A-9 *Pin-Outs (Continued)*

PIN Number	Signal Name	Function
8	GND	Ground, 2.5A max.
9	RI	RS232C
10	CRADLE_DET	Grounded by cradle when in cradle
11	DTR	RS232C
12	Not connected	Not connected
13	POWER_IN	12V, 2.5A max
14	CTS	RS232C
15	USB_5V_DET	USB
16	USB_D_MINUS	USB
17	EXT_PWR_OUT	3.3V @500mA

Accessory Specifications

Single Slot Serial/USB Cradle

Table A-10 *Single SLot Serial/USB Cradle Technical Specifications*

Feature	Description
Dimensions	Height: 13.02 cm (5.13 in.) Width: 15.24 cm (6.0 in.) Depth: 15.24 cm (6.0 in.)
Input Power	12 VDC
Interface	Serial and USB
Operating Temperature	-25°C to 50°C (-13°F to 122°F)
Storage Temperature	-40°C to 70°C (-40°F to 158°F)
Charging Temperature	0°C to 40°C (32°F to 104°F)
Humidity	5% to 95% non-condensing
Drop	76.2 cm (30.0 in.) drops to vinyl tiled concrete at room temperature
Electrostatic Discharge (ESD)	+/- 15 kV air +/- 8 kV contact

Four Slot Ethernet Cradle

Table A-11 *Four Slot Ethernet Cradle Technical Specifications*

Feature	Description
Dimensions	Height: 10.16 cm (4.0 in.) Width: 48.77 cm (19.00 in.) Depth:15.24 cm (6.0 in.)
Input Power	12 VDC
Interface	Ethernet
Operating Temperature	-25°C to 50°C (-13°F to 122°F)
Storage Temperature	-40°C to 70°C (-40°F to 158°F)
Charging Temperature	0°C to 40°C (32°F to 104°F)

Table A-11 *Four Slot Ethernet Cradle Technical Specifications (Continued)*

Feature	Description
Humidity	5% to 95% non-condensing
Drop	76.2 cm (30.0 in.) drops to vinyl tiled concrete at room temperature
Electrostatic Discharge (ESD)	+/- 15 kV air +/- 8 kV contact

Four Slot Charge Only Cradle

Table A-12 *Four Slot Charge Only Cradle Technical Specifications*

Feature	Description
Dimensions	Height: 10.16 cm (4.0 in.) Width: 48.77 cm (19.00 in.) Depth:15.24 cm (6.0 in.)
Input Power	12 VDC
Operating Temperature	-25°C to 50°C (-13°F to 122°F)
Storage Temperature	-40°C to 70°C (-40°F to 158°F)
Charging Temperature	0°C to 40°C (32°F to 104°F)
Humidity	5% to 95% non-condensing
Drop	76.2 cm (30.0 in.) drops to vinyl tiled concrete at room temperature
Electrostatic Discharge (ESD)	+/- 15 kV air +/- 8 kV contact

Four Slot Battery Charger

Table A-13 *Four Slot Battery Charger Technical Specifications*

Feature	Description
Dimensions	Height: 10.16 cm (4.0 in.) Width: 15.24 cm (6.0 in.) Depth: 15.24 cm (6.0 in.)
Input Power	12 VDC
Operating Temperature	0°C to 45°C (32°F to 113°F)
Storage Temperature	-40°C to 70°C (-40°F to 158°F)
Charging Temperature	0°C to 40°C (32°F to 104°F)

Table A-13 *Four Slot Battery Charger Technical Specifications (Continued)*

Feature	Description
Humidity	5% to 95% non-condensing
Drop	76.2 cm (30.0 in.) drops to vinyl tiled concrete at room temperature
Electrostatic Discharge (ESD)	+/- 15 kV air +/- 8 kV contact

Magnetic Stripe Reader

Table A-14 *Magnetic Stripe Reader (MSR) Technical Specifications*

Feature	Description
Interface	Serial with baud rate up to 19,200
Format	ANSI, ISO, AAMVA, CA DMV, user-configurable generic format
Swipe Speed	5 to 50 in. (127 to 1270 mm) /sec, bi-directional
Decoders	Generic, Raw Data
Mode	Buffered, unbuffered
Track Reading Capabilities	Tracks 1 and 3: 210 bpi Track 2: 75 and 210 bpi, autodetect
Operating Temperature	-25°C to 50°C (-13°F to 122°F)
Storage Temperature	-40°C to 70°C (-40°F to 158°F)
Humidity	5% to 95% non-condensing
Drop	1.22 m (4 ft.) drops to concrete
Electrostatic Discharge (ESD)	+/- 15 kV air +/- 8 kV contact

Accessory CAM and MSR Pin-Outs

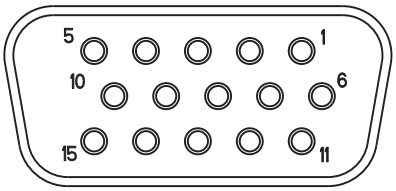


Figure A-9 *CAM and MSR Serial Connector*

Table A-15 *CAM and MSR Serial Connector Pin-outs*

Pin	Signal
1	USB_5V_DET
2	USB_D_MINUS
3	USB_D_PLUS
4	GND
5	GND
6	PWR_EXT_OUT
7	CRADLE_DET*
8	DSR
9	DCD
10	TXD
11	CTS
12	DTR
13	RI
14	RTS
15	RXD

Appendix B Using iDockIt

Introduction

iDockIt™ manages activities that can occur when the MC9190-G is connected to a host computer using a cradle (Ethernet, modem, serial or USB) or a USB or a serial cable. iDockIt can enable the MC9190-G to connect automatically to a host computer, network, or the Internet and then exchange information or launch an application. Use iDockIt to configure settings for each type of connection.

This appendix provides information for configuring iDockIt on an MC9190-G running Windows Mobile 6.5 or Windows CE 6.0.

General options include:

- enabling or disabling iDockIt; if enabled, keeps iDockIt running in the background.
- displaying status and cradle settings the MC9190-G is placed in a cradle.
- defining whether iDockIt should wait before connecting or reconnecting the MC9190-G to the host computer or network and if waiting, the number of seconds to delay.
- disabling specific error messages.

Connection-specific options include:

- launching Microsoft ActiveSync to synchronize with a host computer.
- establishing a connection to a network.
- launching an application after establishing a network connection.
- establishing a connection via a specified modem.

NOTE iDockIt settings and options control cradle events only while iDockIt is running.

Do not use ActiveSync 4.5 or later to synchronize data between a host computer and a Windows CE based device through an Ethernet cradle.

General Recommendations

The MC9190-G should not be placed in a cradle or connected when the host computer to which it is physically connected is started or restarted. If the MC9190-G is cradled when the host computer is started or restarted, the MC9190-G attempts to connect before ActiveSync has fully loaded and a proper connection is impossible. Follow these general guidelines for avoiding connection problems:

- Connect only one MC9190-G to the host computer at a time. (More than one serial cable/cradle or USB cable/cradle can be connected simultaneously.)
- When starting or restarting the host computer, wait for the start process to finish completely before placing the MC9190-G in a cradle. When cradled, it is able to make the connection defined in iDockIt settings.
- If the MC9190-G was connected to the host computer when the host computer was started, remove the MC9190-G from the cradle, restart the host computer, and then return the MC9190-G to the cradle.
- Performing a warm boot on the MC9190-G can be useful. Remove the MC9190-G from the cradle before performing a warm boot. Restart iDockIt and then recradle the MC9190-G.
- For additional information, refer to Microsoft ActiveSync Help on your host computer.

Prepare the MC9190-G To Connect

When using Microsoft ActiveSync, first established a partnership between the MC9190-G and the host computer. This should occur the first time the MC9190-G is placed in a cradle. If using an Ethernet cradle, first set up the partnership with the host computer using a serial or USB cable or cradle.

Enable iDockIt To Manage Connections Automatically

To connect automatically to a host computer or network:

1. Check **Enable iDockIt**.
2. Check or uncheck **Display status when cradled**.
3. Check or uncheck **Display settings when cradled**.
4. Check or uncheck **Autoconnect**.
5. Tap the iDockIt tab (**Ethernet**, **Direct** or **Modem**) that corresponds to the cradle type.
6. Check **Establish network connection** and optionally **Launch application**.

Enable iDockIt To Manage Connections Manually

To connect manually to a host computer or network:

1. Check **Enable iDockIt**.
2. Check or uncheck **Display status when cradled**.
3. Check **Display settings when cradled**. When the MC9190-G is placed in the cradle, the **Settings** tab displays automatically.
4. Uncheck **Autoconnect**.
5. Tap the iDockIt tab (**Ethernet**, **Direct** or **Modem**) that corresponds to the cradle type.

6. Check **Establish network connection** and optionally **Launch application**.

When the MC9190-G is placed in a cradle, iDockIt displays the settings tab corresponding to that cradle. Choose the type of connection and tap . Alternately, establish a new connection settings before placing the MC9190-G in the cradle.

Launch Application Upon Connection

To launch an application when connected:

1. Check **Enable iDockIt**.
2. Tap the tab (**Ethernet**, **Direct** or **Modem**) that corresponds to the type of cradle.
3. Select a connection option as described above.
4. Tap **Launch application**.
5. Tap **Select** and select the application to launch when the MC9190-G is placed in the cradle. Enter any necessary program arguments.
6. Tap **OK**. The selected application appears in the text box.

View Connection Status

To determine the connection status, tap the **Status** tab. See *Status Tab on page B-9* or *Status Tab on page B-17*.

Minimize iDockIt

To minimize iDockIt, tap **X**. iDockIt controls cradle events while minimized.

Exit iDockIt

To close the application, tap **Menu** > **Exit**. iDockIt does not control cradle events when closed.

Windows Mobile 6.5 Configuration

General Tab

Settings on the **General** tab complement the options set for the cradle.

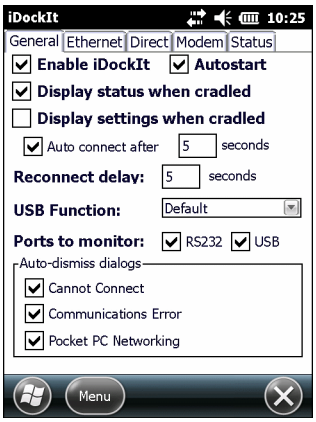


Figure B-1 *General Settings Tab*

- **Enable iDockIt** - Enables iDockIt to control cradle events. When the MC9190-G is placed in a cradle, iDockIt identifies the type of cradle and perform the activities configured.
- **Autostart** - Enables iDockIt to start automatically when the MC9190-G is rebooted.
- **Display status when cradled** - Displays the iDockIt **Status** tab when the MC9190-G is placed in the cradle. If **Display settings when cradled** is selected, the settings tab for the type of cradle detected displays and then the **Status** tab displays after the specified time elapses.
- **Display settings when cradled** - Displays the cradle settings tab when the MC9190-G is placed in the cradle.
- **Auto connect after x seconds** - to automatically make the connection defined on the cradle tab after a specific delay. The delay provides the opportunity to review or change connection options. During this waiting period, you can select either **Menu** > **Connect** or **Menu** > **Cancel** to connect immediately or cancel automatic connection.

CAUTION If **Display settings when cradled** is selected and **Auto connect after** is not selected, iDockIt only displays the cradle settings tab when the MC9190-G is placed in a cradle and does not attempt to connect to the network.

- **Reconnect delay** - Specifies the number of seconds iDockIt waits after a connection is lost before attempting to reconnect.
- **USB Function** - When placed into a USB cradle, iDockIt needs to know whether the cradle directly connects to a host computer or if the cradle connects to a network via an Ethernet cable. If using iDockIt to synchronize with a host computer using ActiveSync via USB cable or cradle, select **RNDIS**. If using iDockIt to connect to a network though an Ethernet cradle, select **Serial**.

  Option are Default, iDockIt, RNDIS and Serial.
- **Ports to monitor** - If **RS232** is check, iDockIt monitors the serial ports for direct or modem connection. If **USB** is checked iDockIt monitors USB connections.

- **Auto-dismiss dialogs** - Configure iDockIt to dismiss several error messages that might be displayed as iDockIt makes the connection. These messages do not require any action. To auto-dismiss a message, tap the checkbox next to its title. If the message occurs during a connection attempt, iDockIt allows it and the event appears in the **Status** window.
  - **Cannot Connect** - The answering modem has disconnected. To check your connection settings and change them if needed, tap **Settings**.

    This message may be displayed when the MC9190-G is removed from a cradle, breaking the connection. Tapping Settings would display the Pocket host computer Connections dialog. Since you should not need to change these settings, the error message can be dismissed automatically.
  - **Communications Error** - Cannot start communications with the desktop computer. Reconnect the MC9190-G. If the problem persists, see Microsoft ActiveSync Help.

    This message is displayed when ActiveSync attempts to connect to a host computer and synchronize data but cannot find the computer name. Since this message may appear in the course of a successful connection attempt, it can be dismissed automatically.
  - **Pocket PC Networking** - Unable to obtain a server-assigned IP address. Try again later or enter an IP address in Network settings.

    This dialog may appear periodically when the MC9190-G is out of network range. The message has nothing to do with the connection through a cradle or cable and can therefore be dismissed automatically.

Ethernet Tab

If using an Ethernet cradle, you can establish an Internet or Intranet connection to a network and/or launch a specified application on the MC9190-G.

NOTE Do not use ActiveSync 4.5 or later to synchronize data between a host computer and a Windows Mobile based device through an Ethernet cradle.

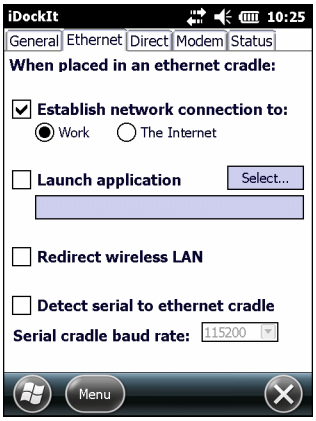


Figure B-2 *Ethernet Settings Tab*

- **Establish network connection to** - Establishes a network connection when the MC9190-G is placed in the cradle.

  Select this option in conjunction with **Launch application**. After iDockIt establishes the network connection, it launches the specified application.

- **Launch application** - Launches the selected application when the MC9190-G is placed in the cradle. iDockIt uses the specified command line parameters.

1. Tap **Select** to open the **Select Auto-Launch Application** window.
2. Select a File Type in the drop-down list.
3. Select a folder (as needed).
4. Select a file name in the list.
5. In the **Program arguments** field, enter command line parameters.
6. Tap **OK**.

The selected application appears in the text box.

- **Redirect wireless LAN** - When checked, iDockIt ensures that any existing wireless connection is redirected so that it does not conflict with iDockIt settings.

  If iDockIt is configured for a Work connection and the wireless LAN is also configured for Work, iDockIt switches the wireless LAN to The Internet and vice versa.
- **Detect serial to ethernet cradle** - This option is not used.
- **Serial cradle baud rate** - Specifies the baud rate iDockIt should use for a serial connection to the Ethernet cradle. Set this rate to match the baud rate configured for the cradle. For maximum performance, always use the maximum baud rate of 115200.

  If using a USB-to-Ethernet cradle, the USB driver automatically determines the connection speed.

Direct Tab

If using a serial or USB cradle or connect to the MC9190-G with a serial or USB cable, automatically synchronize with the connected host computer. Alternatively, if the host computer supports RAS connections, connect to a network through a host computer and/or launch a specified application on the MC9190-G.

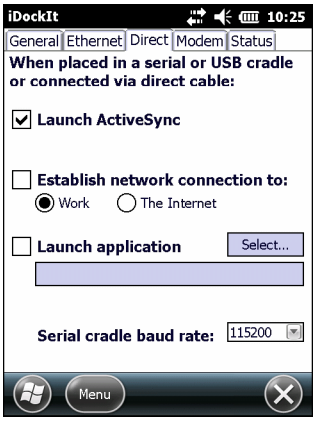


Figure B-3 *Direct (Serial/USB) Settings Tab*

- **Launch ActiveSync** - Launches ActiveSync when the MC9190-G is placed in a serial or USB cradle or when connected to a serial or USB cable. If the MC9190-G has a partnership with the host computer, ActiveSync automatically synchronizes with the host computer.

NOTE Selecting this option automatically deselects **Establish network connection to** and **Launch application**. Similarly, selecting **Establish network connection to** or **Launch application** automatically deselects **Launch ActiveSync**.

- **Establish network connection to** - Establishes a connection to a network when the MC9190-G is placed in a serial or USB cradle or connected to a serial or USB cable. In order to establish a connection to the network, connect the MC9190-G to a host computer with a RAS server.

  Selecting this option, automatically deselects **Launch ActiveSync**.

  Select this option in conjunction with **Launch application**. After iDockIt establishes the network connection, it launches the specified application.

- **Launch application** - Launches the selected application when the MC9190-G is placed in a serial or USB cradle or connected to a serial or USB cable. iDockIt uses the specified command line parameters. Select an application to launch.

  1. Tap **Select** to open the **Select Auto-Launch Application** window.
  2. Select a File Type in the drop-down list.
  3. Select a folder (as needed).
  4. Select a file name in the list.
  5. In the **Program arguments** field, enter command line parameters.
  6. Tap **OK**.

  The selected application appears in the text box.

- **Serial cradle baud rate** - Specify the baud rate iDockIt should use for a serial cable or cradle. Set this rate to match the host computer that the cradle or cable is connected to.

  If using a USB cradle or cable, the USB driver automatically determines the connection speed.

Modem Tab

If using a modem cradle, automatically connect to a remote host computer or network or you can synchronize with a host computer with which you have set up a partnership using ActiveSync. Alternatively, connect to the network and/or launch a specified application on the MC9190-G.

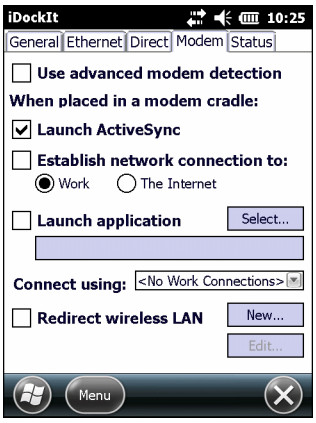


Figure B-4 *Modem Settings Tab*

- **Use advanced modem detection** - Check this option to have iDockIt perform a more thorough modem detection check. This may be necessary if using an external modem connected via serial cable. Normally, iDockIt only performs a modem detection check if it detects that the MC9190-G has been placed in a cradle.

When this option is checked, iDockIt continuously checks for the presence of a modem. In order for this option take effect, check **RS232** checked under **Ports to monitor** on the **General** settings tab.

- **Launch ActiveSync** - Launches ActiveSync when the MC9190-G is placed in a modem cradle.

> ***NOTE*** Selecting this option automatically deselects **Establish network connection to** and **Launch application**. Similarly, selecting **Establish network connection to** or **Launch application** automatically deselects **Launch ActiveSync**.

- **Establish network connection to** - Establishes a network connection when the MC9190-G is placed in a modem cradle. iDockIt uses the modem connection specified in the **Connect using** list.

  Selecting this option, automatically deselects **Launch ActiveSync**.

  Select this option in conjunction with **Launch application**. After iDockIt establishes the network connection, it launches the specified application.

- **Launch application** - Launches the selected application when the MC9190-G is placed in a modem cradle. iDockIt uses the specified command line parameters. You must select an application to launch. If **Establish network connection to** is selected, the application does not launch until a connection is successfully established.

  1. Tap **Select** to open the **Select Auto-Launch Application** window.
  2. Select a File Type in the drop-down list.
  3. Select a folder (as needed).
  4. Select a file name in the list.
  5. In the **Program arguments** field, enter command line parameters.
  6. Tap **OK**.

  The selected application appears in the text box.

- **Connect using** - Select a connect type from the drop-down list.

  If you check the **General** settings options to **Display settings when cradled** and **Auto-connect after**, you have an opportunity to select the appropriate modem connection when you cradle the MC9190-G.

  If you do not check the two options, iDockIt uses the last modem connection selected.

  - **New** - Create a new modem connection.
  - **Edit** - Change the settings of an existing modem connection.
  - **Delete** - Delete the currently displayed modem connection.

- **Redirect wireless LAN** - Need info.

Create A New Modem Connection

1. Obtain the following information from the ISP or network administrator:
   - dial-up access telephone number
   - user name
   - password
   - domain name
   - TCP/IP settings.
2. Tap **New**.

3. Enter a name for the connection.
4. In the **Modem** drop-down list, select the modem type. For the modem cradle, select **Hayes Compatible on COM1**.
5. Tap **Configure** and change any Port Settings in the **Device Properties** window, depending on requirements for the modem.
6. Tap **OK**.
7. Tap **Next**.
8. Enter the country code, area code and phone number and then tap **Next**.
9. Enter login information (user name, password, and domain name) and then tap **Next**.
10. Do not change any TCP/IP settings unless directed by your ISP or network administrator. Tap **Next** and then tap **Finish**. The new modem connection appears in the drop-down list.

Edit an Existing Modem Connection

1. In the **Connect using** drop-down list, select the modem connection to modify.
2. Tap **Edit**.
3. In the **Connection Properties** window, make any necessary changes to the connection name, modem, or modem configuration options and then tap **Next**.
4. Change the country code, area code and phone number and then tap **Next**.
5. Change the login information and then tap **Next**.
6. Do not change any TCP/IP settings unless directed by your ISP or network administrator. Tap **Next** and then tap **Finish**.

Delete an Existing Modem Connection

1. In the **Connect using** drop-down list, select the modem connection to delete.
2. Tap and hold the **Connect using** box until the pop-up menu displays.
3. Select **Delete** from the pop-up menu.
4. Tap **Yes**. The modem connection is removed from the drop-down list.

Status Tab

The **Status** tab displays connection-related events as they occur. Check **Display status when cradled** on the **General** tab to display this tab automatically whenever the MC9190-G is placed in a cradle.

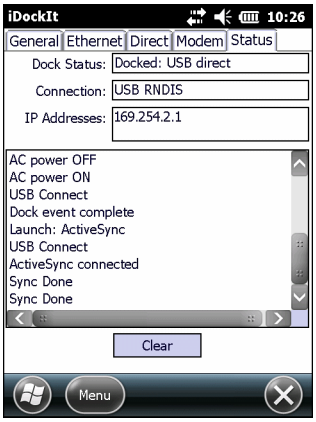


Figure B-5 *Status Tab*

- **Dock Status** - Indicates **Docked** and the type of connection (Serial, Ethernet or USB) when the MC9190-G is cradled or **Not docked** when the MC9190-G is removed from the cradle.
- **Connection** - Displays the name of the connection.
- **IP Addresses** - Displays all valid IP addresses assigned to the MC9190-G. When the MC9190-G is not cradled, displays either the IP address of the network adapter or, if no network connection, a default IP address.
- **Status** window - Displays a scrolling list of cradle events as they occur, including:
  - **AC power ON** and **AC power OFF** when the MC9190-G is inserted and removed.
  - **Carrier detect**, **baud rate**, and **(cradle type) connect** when iDockIt identifies the cradle and connection speed.
  - **Launch (application)** when iDockIt launches the selected application, followed by confirmation when the application has been launched successfully.
  - **Sync done** when synchronization has completed successfully.
  - **Dismiss (error message)** when iDockIt dismisses a message you have designated.
  - **Dock event complete** when iDockIt has completed all defined tasks. If the MC9190-G is removed from the cradle before this item appears, regardless of dock status, you may interrupt assigned tasks.

Tap **Clear** to delete all events from the status window.

Windows CE 6.0 Configuration

General Tab

Settings on the **General** tab complement the options set for the cradle.

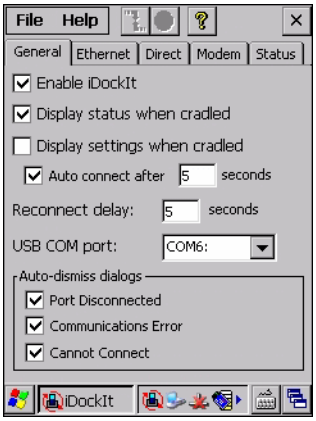


Figure B-6 *General Settings Tab*

- **Enable iDockIt** - Enables iDockIt to control cradle events. When the MC9190-G is placed in a cradle, iDockIt identifies the type of cradle and perform the activities configured. Uncheck this option to restore control of cradle events to Microsoft ActiveSync.
- **Display status when cradled** - Displays the iDockIt **Status** tab when the MC9190-G is placed in the cradle. If you also checked **Display settings when cradled**, you first see the **Settings** tab for the type of cradle detected and then the **Status** tab after the specified time elapses. Uncheck this option to prevent display of the iDockIt **Status** tab.
- **Display settings when cradled** - Displays the cradle settings tab when the MC9190-G is placed in the cradle.
- **Auto connect after x seconds** - to have iDockIt wait a specified time before creating a connection. The delay provides the opportunity to review or change cradle settings. During this waiting period, select either or in the menu bar to connect immediately or cancel automatic connection.

CAUTION If you do not check this option (or if you check this option but do not specify the number of seconds), iDockIt displays the cradle settings tab when you cradle the MC9190-G but does not attempt to establish a connection.

- **Reconnect delay** - This feature has not been implemented.
- **USB COM port** - The first time running iDockIt, the application attempts to determine whether the MC9190-G has a USB port and if so, the COM port to which it is mapped.

  If iDockIt does not find a USB port, **None** displays. Choose from all available COM ports in the list. In most cases, this setting does not have to be changed.
- **Auto-dismiss dialogs** - Configure iDockIt to dismiss several error messages that might be displayed as iDockIt makes the connection. These messages do not require any action. To auto-dismiss a message, tap

the checkbox next to its title. If the message occurs during a connection attempt, iDockIt allows it and the event appears in the Status window.

- **Port Disconnected** - Cannot start communications with the desktop computer. The connection was terminated.

  This message displays when the MC9190-G is removed from a cradle, breaking the connection. Since this is not really an error, the message can be dismissed automatically.
- **Communications Error** - Cannot start communications with the desktop computer. The computer is either not available or busy and currently cannot accept connections.

  This message displays when ActiveSync attempts to connect to a host computer and synchronize data but cannot find the computer name. Since this message may appear in the course of a successful connection attempt, it can be dismissed automatically.

Ethernet Tab

If using an Ethernet cradle, automatically connect to and sync with a partnered host computer on the network. Alternatively, establish a generic connection to the network and/or launch a specified application on the MC9190-G.

NOTE Do not use ActiveSync 4.5 or later to synchronize data between a host computer and a Windows CE-based device through an Ethernet cradle.

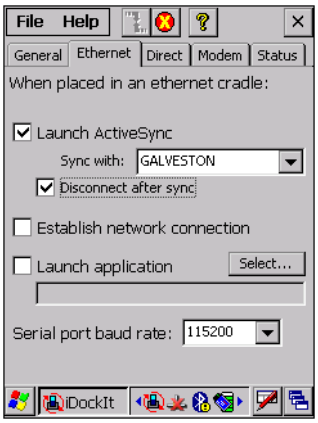


Figure B-7 *Ethernet Tab*

- **Launch ActiveSync** - Launches ActiveSync when the MC9190-G in placed in the cradle. ActiveSync connects to the host computer specified in the **Sync with** option on the network.

NOTE Before selecting this option, connect to the host computer with a serial or USB cable or cradle and use ActiveSync to set up a partnership with that host computer.

Selecting this option automatically deselects **Establish network connection to** and **Launch application**. Similarly, selecting **Establish network connection to** or **Launch application** automatically deselects **Launch ActiveSync**.

- **Sync with -** Selects the host computer with which to ActiveSync. The MC9190-G can have partnerships with up to two host computers. The drop-down list displays only the host computers with which the MC9190-G has a partnership.

- **Disconnect after sync** - Sets the MC9190-G to automatically disconnect from the selected host computer when ActiveSync completes synchronization.
- **Establish network connection** - Establishes a connection to the network when the MC9190-G is placed in a cradle.

  Selecting this option, automatically deselects **Launch ActiveSync**.

  Select this option in conjunction with **Launch application**. After iDockIt establishes the network connection, it launches the specified application.
- **Launch application** - Launches the selected application when the MC9190-G is placed in the cradle. iDockIt uses the specified command line parameters.

  Selecting this option, automatically deselects **Launch ActiveSync**.

  1. Tap **Select** to open the **Select Auto-Launch Application** window.
  2. Select a File Type in the drop-down list.
  3. Select a folder (as needed).
  4. Select a file name in the list.
  5. In the **Program arguments** field, enter command line parameters.
  6. Tap **OK**.

  The selected application appears in the text box.
- **Serial port baud rate** - Specifies the baud rate iDockIt uses for a serial connection to the Ethernet cradle. Set this rate to match the baud rate configured for the cradle. For maximum performance, always use the maximum baud rate of 115200.

  If using a USB-to-Ethernet cradle, the USB driver automatically controls the connection speed.

Direct Tab

If using a serial or USB cradle or a serial or USB cable, automatically connect to the connected host computer or network or choose a host computer with which to have set up a partnership using ActiveSync. Alternatively, if the host computer supports RAS connections, connect to the network through a host computer and/or launch a specified application on the MC9190-G.

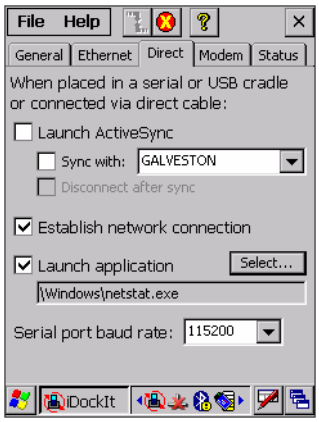


Figure B-8 *Direct Tab*

- **Launch ActiveSync** - Launches ActiveSync when the MC9190-G is placed in a serial or USB cradle or when connected it to a serial or USB cable.

> ***NOTE*** Selecting this option automatically deselects **Establish network connection to** and **Launch application**. Similarly, selecting **Establish network connection to** or **Launch application** automatically deselects **Launch ActiveSync**.

- **Sync with** - When this option is not checked, the MC9190-G synchronizes data with the host computer to which it is connected. To synchronize with a different host computer, check this option and select the host computer in the list.

  ActiveSync is able to connect to this alternate host computer automatically only if you check this option.
- **Disconnect after sync** - Disconnect automatically from the host computer when ActiveSync has completed synchronization.
- **Establish network connection to** - Establishes a connection to the network when the MC9190-G is placed in a serial or USB cradle or connected to a serial or USB cable. In order to establish a connection to the network, connect the MC9190-G to a host computer with a RAS server. If ActiveSync is running on a host computer, it can be used as a RAS server.

  Selecting this option, automatically deselects **Launch ActiveSync**.

  Selecting this option in conjunction with **Launch application**. After iDockIt establishes the network connection, it launches the specified application.
- **Launch application** - Launches the selected application when you place the MC9190-G in a serial or USB cradle or connect it to a serial or USB cable. iDockIt uses the specified command line parameters. You must select an application to launch.

  1. Tap **Select** to open the **Select Auto-Launch Application** dialog.
  2. Select a **File Type** in the drop-down list.
  3. Select a **Folder** (as needed).
  4. Select a file name in the list.
  5. Use the input panel to specify command line parameters.
  6. Tap **OK** at the top of the screen.

  The selected application appears in the settings tab.
- **Serial port baud rate** - Specifies the baud rate iDockIt should use for a serial cable or cradle. Set this rate to match the host computer that the cradle or cable is connected to.

  If using a USB cradle or cable, the USB driver automatically controls the connection speed.

USB Notes

The InVision USB cradle driver for the host computer maps the USB port to a virtual COM port, assigning it the next available port number. Refer to the user guide for your cradle.

Before installing the driver, open ActiveSync Connection Settings to see which ports are available. After installing the driver, a new COM port is available. Select this port for your USB cradle.

Check **Allow USB....** in ActiveSync Connection Settings only if you have a direct USB connection (no cradle) to the MC9190-G.

If the host computer or ActiveSync is reset, the port selection may revert to COM1. Open **Connection Settings** and re-select the correct USB COM port.

Modem Tab

If using a modem cradle, you can automatically connect to a remote host computer or network or you can choose a host computer with which you have set up a partnership using ActiveSync. Alternatively, you can connect to your network and/or launch a specified application on the MC9190-G.

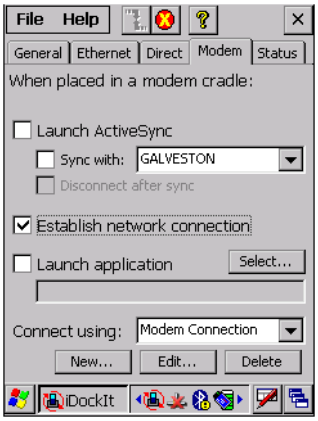


Figure B-9 *Modem Settings Tab*

- **Launch ActiveSync** - Launch ActiveSync when the MC9190-G is placed in a modem cradle.

NOTE Selecting this option automatically deselects **Establish network connection** and **Launch application**. Similarly, selecting **Establish network connection** or **Launch application** automatically deselects **Launch ActiveSync**.

- **Sync with -** Synchronizes data with the host computer that is directly connected to the remote modem. To synchronize with a different host computer, check this option and select the host computer in the list.
- **Disconnect after sync -** Disconnect automatically from the selected host computer when ActiveSync has completed synchronization.
- **Establish network connection** - Establish a network connection when the MC9190-G is placed in a modem cradle. iDockIt uses the modem connection specified in the **Connect using** drop-down list.

  Selecting this option automatically deselected **Launch ActiveSync**.

  You can check this option in conjunction with **Launch application**. After iDockIt establishes the network connection, it launches the specified application.
- **Launch application** - Launch the selected application when the MC9190-G is placed in a modem cradle. iDockIt uses the specified command line parameters.

  If **Establish network connection** is checked the application does not be launched until a connection is successfully established.

  1. Tap **Select** to open the **Select Auto-Launch Application** window.
  2. Select a File Type in the drop-down list.
  3. Select a folder (as needed).
  4. Use the input panel to specify command line parameters.

5. Select a file name in the list.
6. Tap **OK** at the top of the screen.

The selected application appears in the text box.

- **Connect using** - Lists all modem connections that have been defined.

If you check the General settings options to **Display settings when cradled** and **Auto-connect after x seconds**, you have an opportunity to select the appropriate modem connection when you place the MC9190-G in the cradle.

If you do not check the above options, iDockIt uses the last modem connection you selected.

Tap **New** to create a new modem connection.

Tap **Edit** to change the settings of an existing modem connection.

Tap **Delete** to delete the currently displayed modem connection.

Create A New Modem Connection

1. Get the following information from your ISP or network administrator: dial-up access telephone number, user name, password, domain name, and TCP/IP settings.
2. Tap **New** below the **Connect using** list.
3. In the Connection Properties dialog, enter a name for the connection.
4. In the Modem list, tap your modem type. For the modem cradle, tap **Hayes Compatible on COM1**.
5. Tap **Configure** and change any Port Settings or Call Options in the Device Properties dialog, depending on requirements for your modem.
6. Tap **Next** after entering the connection name and choosing a modem.
7. Enter the access phone number and then tap **Next**.
8. Enter Login information (user name, password, and domain name) and then tap **Next**.
9. You should not need to change any TCP/IP settings unless directed by your ISP or network administrator. Tap **Next** and then tap **Finish** in the next server address dialog.

The new modem connection is in the drop-down list.

Edit An Existing Modem Connection

1. In the **Connect using** list, select the modem connection you need to modify.
2. Tap **Edit**.
3. In the Connection Properties dialog, make any necessary changes to the connection name, modem, or modem configuration options. Tap **Next** to continue or **OK** to close the dialog.
4. If you continue, you can change the access phone number. Tap **Next** to continue or **OK** to close the dialog.
5. If you continue, you can change your login information. If you need to make any TCP IP setting changes, tap **Next**. Otherwise, tap **OK** to close the dialog.

Delete An Existing Modem Connection

1. In the **Connect using** list, select the modem connection you want to delete.
2. Tap **Delete**.
3. The Modem Settings dialog asks you to confirm that you want to delete the named modem connection. Tap **Yes**.

The modem connection is removed from the drop-down list.

Status Tab

The **Status** tab displays connection-related events as they occur. Check **Display status when cradled** on the **General** tab to display this tab automatically whenever the MC9190-G is placed in a cradle.

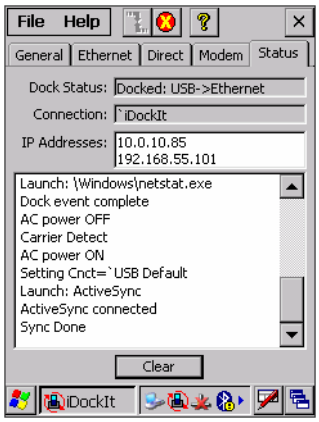


Figure B-10 *Status Tab*

- **Dock Status** - Indicates **Docked** and the type of connection (Serial, Ethernet or USB) when the MC9190-G is cradled or **Not docked** when the MC9190-G is removed from the cradle.
- **Connection** - Displays the name of the connection.
- **IP Addresses** - Displays all valid IP addresses assigned to the MC9190-G. When the MC9190-G is not cradled, displays either the IP address of the network adapter or, if no network connection, a default IP address.
- Status window - Displays a scrolling list of cradle events as they occur, including:
  - **AC power ON** and **AC power OFF** when the MC9190-G is inserted and removed.
  - **Carrier detect**, **baud rate**, and **(cradle type) connect** when iDockIt identifies the cradle and connection speed.
  - **Launch (application)** when iDockIt launches the selected application, followed by confirmation when the application has been launched successfully.
  - **Sync done** when synchronization has completed successfully.
  - **Dismiss (error message)** when iDockIt dismisses a message you have designated.
  - **Dock event complete** when iDockIt has completed all defined tasks. If the MC9190-G is removed from the cradle before this item appears, regardless of dock status, you may interrupt assigned tasks.

Tap **Clear** to empty all events from the Status window.

Un-installing iDockIt

On Windows Mobile 6.5 devices:

1. Exit iDockIt.
2. In the **System** tab, tap the **Remove Programs** icon.
3. Select **InVision iDockIt** in the program list.
4. Tap **Remove** and select **Yes** in the **Remove Program** dialog.
5. Tap **OK**.

On Windows CE 6.0 devices:

1. Exit iDockIt.
2. Tap **Start** > **Settings** and double-tap the **Remove Programs** icon.
3. Select **InVision iDockIt** in the program list.
4. Tap **Remove** and select **Yes** in the **Remove Program** dialog.
5. Ignore the **Remove Programs Error** dialog if it appears. Tap **OK**.
6. Close the **Remove Programs** dialog and **Settings** windows.

Appendix C Special Software Configurations

Bluetooth Configuration Setting

The MC9190-G supports both the Microsoft Bluetooth stack and the StoneStreet One Bluetooth stack. Only one Bluetooth stack can be used at a time. By default, the Microsoft Bluetooth stack is enabled. A registry key on the MC9190-G can be modified to disable the Microsoft stack and enable the StoneStreet One stack.

Using a registry editor, navigate to the following:

[HKEY_LOCAL_MACHINE\Software\SymbolBluetooth]

Edit the following key:

“SSStack”=dword:1

where:

0 = enable Microsoft stack and disable StoneStreet One stack (default)

1 = enable StoneStreet One stack and disable Microsoft stack

After setting the registry key, warm boot the MC9190-G.

Sample Applications and StartUpCtl Configuration

The MC9190-G with Windows CE 6.0 contains a set of sample applications that can be installed on the MC9190-G. As part of the installation, an application called StartUpCtl is also installed.

On the desktop, double-tap the **Install Samples** icon.

The Sample Applications and StartUpCtl application installs on the MC9190-G and the Sample Applications window appears.

After a warm or cold boot, the **Sample Applications** window appears automatically.

StartUpCtl Application Configuration

StartUpCtl application can be used to automatically launch any application whenever a warm or cold boot is performed.

Refer to the StartUpCtl instruction available with the StartUpCtl software download available on the Support Central web site: http//supportcentral.motorola.com.

Removing Sample Applications and StartUpCtl Application

To remove the installed applications (before a cold boot is performed):

1. Tap **Start** > **Setting** > **Control Panel** > **Remove Programs** icon.
2. Select **Motorola Samples.C** from the list.
3. Tap the **Remove** button.
4. Tap the **Yes** button.
5. Select **Motorola startUpCtl** from the list.
6. Tap the **Remove** button.
7. Tap the **Yes** button.
8. Tap **OK**.

To remove the installed applications (after a cold boot is performed):

1. Tap **Start** > **Programs** > **Windows Explorer**.
2. Open the **Application** folder.
3. Delete the **Sample.C** folder and its contents.
4. Delete the **StartUpCtl** folder and its contents.
5. Delete the **Samples.C** file.
6. Open the **StartUp** folder.
7. Delete the **StartUpCtl** file.

After a cold boot the **Install Samples** icon appears on the desktop.

Switching Between QVGA and VGA Resolution in Windows CE Devices

All MC9190-G configurations ship with VGA displays (640 H x 480 W resolution). All Windows CE configurations, by default, are set to QVGA resolution (320 H x 240 W). Windows CE 6.0 operating system icons and applications are designed for QVGA resolution.

The user can change the display resolution from QVGA to VGA but the icons and applications appear 1/4 of the size as in QVGA mode.

NOTE Application developers wishing to use VGA resolution in Windows CE must write applications to be able to detect the display resolution and display the application properly on the screen.

To switch display resolution:

1. Tap **Start** > **Settings** > **Control Panel** > **Screen Resolution**.

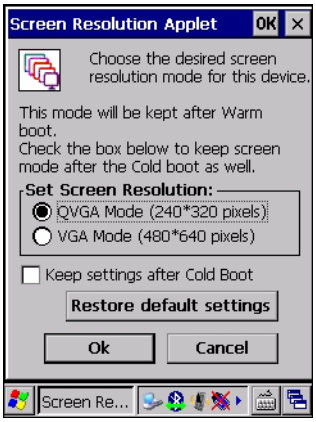


Figure C-1 *Screen Resolution Window*

2. Select the **Set Screen Resolution** radio button.
3. Select the **Keep settings after Cold Boot** checkbox to maintain this resolution after a cold boot.
4. Tap **Ok**.
5. Tap **Yes** to perform a warm boot.

Figure C-2 *Windows CE Desktop in VGA Mode*

Battery Usage Threshold Setting

By default the Battery Usage Threshold value is set to a pre-defined value (500 by default). To change the threshold value, a registry key must be created to allow changing this value.

A battery becomes unhealthy when the *Battery Usage Indicator* reaches a predefined threshold (end of usable life).

NOTE The point at which a battery becomes unhealthy may vary depending upon the environment and charging conditions

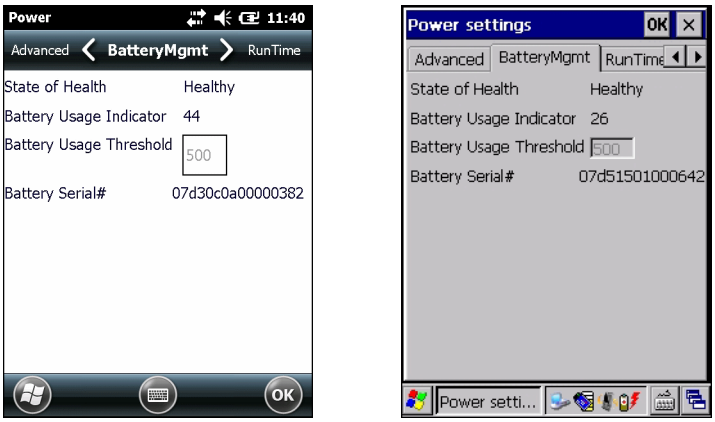


Figure C-3 *Power BatteryMgmt Tab*

Registry Setting

Create the following registry key:

[HKEY_LOCAL_MACHINE\ControlPanel\Power]

"EnableCycleCntThresholdEdit"=DWORD:0

where:

dword:0 = Enable threshold change

Warm boot the MC9190-G to have the registry setting take effect.

1. Tap **Start** > **Settings** > **System** > **Power** > **BatteryMgmt** tab.
   or **Start** > **Control Panel** > **Settings** > **Power** > **BatteryMgmt** tab.

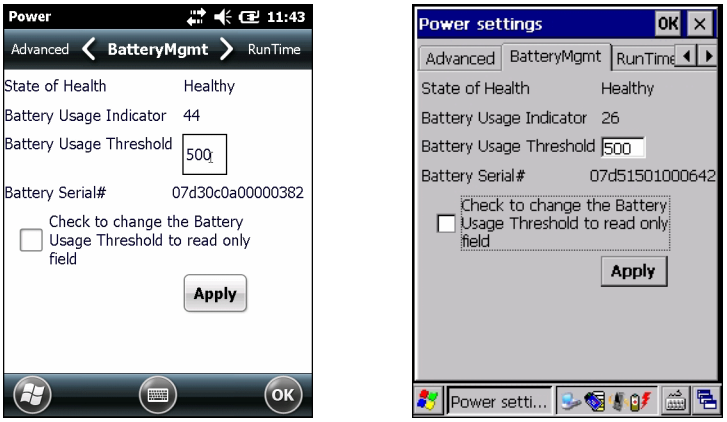


Figure C-4 *BatteryMgmt Tab with Threshold Change Checkbox*

2. In the **Battery Usage Threshold** text box, enter a new value.
3. Select the **Check to change the Battery Age Threshold to read only field** checkbox.
4. Tap **Apply**.

Tap **ok**. The new value is set and then the registry key is deleted.

WLAN Default Settings

By default, the WLAN radio is off when the MC9190-G turns on. To change the default setting edit the following registry key:

[HKEY_LOCAL_MACHINE\Drivers\BuiltIn\WLAN]

"InitialState"=dword:4

where:

dword:4 = WLAN off.

dword:0 = WLAN on.

Warm boot the MC9190-G to have the registry setting take effect.

Glossary

Numeric

802.11. A group of wireless specifications developed by the Institute of Electrical and Electronics Engineers (IEEE). It specifies an over-the-air interface between a wireless client and a base station or between two wireless clients.

802.11a. Operates in the 5 GHz frequency range (5.125 to 5.85 GHz) with a maximum 54Mbit/sec. signaling rate. The 5 GHz frequency band is not as crowded as the 2.4 GHz frequency because it offers significantly more radio channels than the 802.11b and is used by fewer applications. It has a shorter range than 802.11g and is not compatible with 802.11b.

802.11b. Operates in the 2.4 GHz Industrial, Scientific and Measurement (ISM) band (2.4 to 2.4835 GHz) and provides signaling rates of up to 11Mbit/sec. This is a very commonly used frequency. Microwave ovens, cordless phones, medical and scientific equipment, as well as Bluetooth devices, all work within the 2.4 GHz ISM band.

802.11g. Similar to 802.11b, but this standard supports signaling rates of up to 54Mbit/sec. It also operates in the heavily used 2.4 GHz ISM band but uses a different radio technology to boost overall throughput. Compatible with the 802.11b.

A

Access Point. Provides a bridge between Ethernet wired LANs and the wireless network. Access points are the connectivity point between Ethernet wired networks and devices (laptops, hand-held computers, point-of-sale terminals) equipped with a wireless LAN adapter card.

Ad Hoc Mode. A wireless network framework in which devices communicate directly with one another without using an access point.

API. An interface by means of which one software component communicates with or controls another. Usually used to refer to services provided by one software component to another, usually via software interrupts or function calls

Application Programming Interface. See **API**.

ASCII. American Standard Code for Information Interchange. A 7 bit-plus-parity code representing 128 letters, numerals, punctuation marks and control characters. It is a standard data transmission code in the U.S.

Association. The process of determining the viability of the wireless connection and establishing a wireless network's root and designated access points. A mobile computer associates with its wireless network as soon as it is powered on or moves into range.

B

Bar Code. A pattern of variable-width bars and spaces which represents numeric or alphanumeric data in machine-readable form. The general format of a bar code symbol consists of a leading margin, start character, data or message character, check character (if any), stop character, and trailing margin. Within this framework, each recognizable symbology uses its own unique format. See **Symbology**.

Bits per Second (bps). Bits transmitted or received.

Bluetooth. A low-cost, short-range radio link between two devices. Bluetooth can replace cables and can be used to create ad hoc networks and provide a standard way to connect devices.

boot or boot-up. The process a computer goes through when it starts. During boot-up, the computer can run self-diagnostic tests and configure hardware and software.

C

CDRH. (Center for Devices and Radiological Health) A federal agency responsible for regulating laser product safety. This agency specifies various laser operation classes based on power output during operation.

CDRH Class 1. This is the lowest power CDRH laser classification. This class is considered intrinsically safe, even if all laser output were directed into the eye's pupil. There are no special operating procedures for this class.

CDRH Class 2. No additional software mechanisms are needed to conform to this limit. Laser operation in this class poses no danger for unintentional direct human exposure.

CHAP. (Challenge Handshake Authentication Protocol) A type of authentication in which the authentication agent (typically a network server) sends the client program a random value that is used only once and an ID value. Both the sender and peer share a predefined secret. The peer concatenates the random value (or nonce), the ID and the secret and calculates a one-way hash using MD5. The hash value is sent to the authenticator, which in turn builds that same string on its side, calculates the MD5 sum itself and compares the result with the value received from the peer. If the values match, the peer is authenticated.

Cold Boot. A cold boot restarts the mobile computer and erases all user stored records and entries.

COM port. Communication port; ports are identified by number, e.g., COM1, COM2.

Cradle. A cradle is used for charging the terminal battery and for communicating with a host computer, and provides a storage place for the terminal when not in use.

D

DCP. See **Device Configuration Package**.

Decode. To recognize a bar code symbology (e.g., UPC/EAN) and then analyze the content of the specific bar code scanned.

Device Configuration Package. The Motorola Device Configuration Package provides flash partitions, Terminal Configuration Manager (TCM) and the associated TCM scripts. With this package hex images that represent flash partitions can be created and downloaded to the mobile computer.

E

EAP. (Extensible Authentication Protocol) A general authentication protocol used to control network access. Many specific authentication methods work within this framework.

EAP-PEAP. (Extensible Authentication Protocol-Protected Extensible Authentication Protocol) A mutual authentication method that uses a combination of digital certificates and another system, such as passwords.

EAP-TLS. (Extensible Authentication Protocol-Transport Layer Security) A mutual authentication method that uses digital certificates.

EMDK. Enterprise Mobility Developer's Kit.

Ethernet . An IEEE standard network protocol that specifies how data is placed on and retrieved from a common transmission medium.

ESD. Electro-Static Discharge

F

Flash Memory. Flash memory is nonvolatile, semi-permanent storage that can be electronically erased in the circuit and reprogrammed.

H

Hard Reset. See **Cold Boot**.

Hz. Hertz; A unit of frequency equal to one cycle per second.

Host Computer. A computer that serves other terminals in a network, providing such services as computation, database access, supervisory programs and network control.

I

IEC. International Electrotechnical Commission. This international agency regulates laser safety by specifying various laser operation classes based on power output during operation.

IEC (825) Class 1. This is the lowest power IEC laser classification. Conformity is ensured through a software restriction of 120 seconds of laser operation within any 1000 second window and an automatic laser shutdown if the scanner's oscillating mirror fails.

IEEE Address. See **MAC Address**.

Internet Protocol Address. See **IP**.

IP. (Internet Protocol) The IP part of the TCP/IP communications protocol. IP implements the network layer (layer 3) of the protocol, which contains a network address and is used to route a message to a different network or subnetwork. IP accepts “packets” from the layer 4 transport protocol (TCP or UDP), adds its own header to it and delivers a “datagram” to the layer 2 data link protocol. It may also break the packet into fragments to support the maximum transmission unit (MTU) of the network.

IP Address. (Internet Protocol address) The address of a computer attached to an IP network. Every client and server station must have a unique IP address. A 32-bit address used by a computer on a IP network. Client workstations have either a permanent address or one that is dynamically assigned to them each session. IP addresses are written as four sets of numbers separated by periods; for example, 204.171.64.2.

K

Key. A key is the specific code used by the algorithm to encrypt or decrypt the data. Also see, **Encryption** and **Decrypting**.

L

laser scanner. A type of bar code reader that uses a beam of laser light.

LASER. (Light Amplification by Stimulated Emission of Radiation) The laser is an intense light source. Light from a laser is all the same frequency, unlike the output of an incandescent bulb. Laser light is typically coherent and has a high energy density.

Laser Diode. A gallium-arsenide semiconductor type of laser connected to a power source to generate a laser beam. This laser type is a compact source of coherent light.

LEAP. (Lightweight Extensible Authentication Protocol) A mutual authentication method that uses a username and password system.

LED Indicator. A semiconductor diode (LED - Light Emitting Diode) used as an indicator, often in digital displays. The semiconductor uses applied voltage to produce light of a certain frequency determined by the semiconductor's particular chemical composition.

Liquid Crystal Display (LCD). A display that uses liquid crystal sealed between two glass plates. The crystals are excited by precise electrical charges, causing them to reflect light outside according to their bias. They use little electricity and react relatively quickly. They require external light to reflect their information to the user.

M

Mobile Computer. In this text, mobile computer refers to the Motorola Series 9190 wireless portable computer. It can be set up to run as a stand-alone device, or it can be set up to communicate with a network, using wireless radio technology.

MS CHAP. (Microsoft Challenge Handshake Authentication Protocol) is the Microsoft version of CHAP and is an extension to RFC 1994. Like the standard version of CHAP, MS-CHAP is used for PPP authentication; in this case, authentication occurs between a PC using Microsoft Windows NT or Microsoft Windows 95 and a Cisco router or access server acting as a network access server (NAS).

N

Nominal. The exact (or ideal) intended value for a specified parameter. Tolerances are specified as positive and negative deviations from this value.

P

PAN . Personal area network. Using Bluetooth wireless technology, PANs enable devices to communicate wirelessly. Generally, a wireless PAN consists of a dynamic group of less than 255 devices that communicate within about a 33-foot range. Only devices within this limited area typically participate in the network.

PING. (Packet Internet Groper) An Internet utility used to determine whether a particular IP address is online. It is used to test and debug a network by sending out a packet and waiting for a response.

Q

QWERTY. A standard keyboard commonly used on North American and some European PC keyboards. “QWERTY” refers to the arrangement of keys on the left side of the third row of keys.

R

RAM. Random Access Memory. Data in RAM can be accessed in random order, and quickly written and read.

ROM. Read-Only Memory. Data stored in ROM cannot be changed or removed.

Router. A device that connects networks and supports the required protocols for packet filtering. Routers are typically used to extend the range of cabling and to organize the topology of a network into subnets. See **Subnet**.

RS-232. An Electronic Industries Association (EIA) standard that defines the connector, connector pins, and signals used to transfer data serially from one device to another.

S

Scanner. An electronic device used to scan bar code symbols and produce a digitized pattern that corresponds to the bars and spaces of the symbol.

Scanning Mode. The scanner is energized, programmed and ready to read a bar code.

Shared Key. Shared Key authentication is an algorithm where both the AP and the MU share an authentication key.

Soft Reset. See **Warm Boot**.

Specular Reflection. The mirror-like direct reflection of light from a surface, which can cause difficulty decoding a bar code.

Subnet. A subset of nodes on a network that are serviced by the same router. See **Router**.

Subnet Mask. A 32-bit number used to separate the network and host sections of an IP address. A custom subnet mask subdivides an IP network into smaller subsections. The mask is a binary pattern that is matched up with the IP address to turn part of the host ID address field into a field for subnets. Default is often 255.255.255.0.

Symbol. A scannable unit that encodes data within the conventions of a certain symbology, usually including start/stop characters, quiet zones, data characters and check characters.

Symbology. The structural rules and conventions for representing data within a particular bar code type (e.g. UPC/EAN, Code 39, PDF417, etc.).

T

TCP/IP. (Transmission Control Protocol/Internet Protocol) A communications protocol used to internetwork dissimilar systems. This standard is the protocol of the Internet and has become the global standard for communications. TCP provides transport functions, which ensures that the total amount of bytes sent is received correctly at the other end. UDP is an alternate transport that does not guarantee delivery. It is widely used for real-time voice and video transmissions where erroneous packets are not retransmitted. IP provides the routing mechanism. TCP/IP is a routable protocol, which means that all messages contain not only the address of the destination station, but the address of a destination network. This allows TCP/IP messages to be sent to multiple networks within an organization or around the world, hence its use in the worldwide Internet. Every client and server in a TCP/IP network requires an IP address, which is either permanently assigned or dynamically assigned at startup.

Terminal Emulation. A “terminal emulation” emulates a character-based mainframe session on a remote non-mainframe terminal, including all display features, commands and function keys. The MC9190 Series supports Terminal Emulations in 3270, 5250 and VT220.

TKIP. (Temporal Key Integrity Protocol) A wireless encryption protocol that periodically changes the encryption key, making it harder to decode.

TLS. (Transport Layer Security) TLS is a protocol that ensures privacy between communicating applications and their users on the Internet. When a server and client communicate, TLS ensures that no third party may eavesdrop or tamper with any message. TLS is the successor to the Secure Sockets Layer (SSL).

V

Visible Laser Diode (VLD). A solid state device which produces visible laser light.

W

Warm Boot. A warm boot restarts the mobile computer by closing all running programs. All data that is not saved to flash memory is lost.

WAP. (Wireless Application Protocol) A set of specifications, developed by the WAP Forum, that lets developers using Wireless Markup Language build networked applications designed for handheld wireless devices. WAP was designed to work within the constraints of these devices: a limited memory and CPU size, small, monochrome screens, low bandwidth and erratic connections.

WEP. Wired-Equivalent Privacy protocol was specified in the IEEE 802.11 standard to provide a WLAN with a minimal level of security and privacy comparable to a typical wired LAN, using data encryption.

WPA. Wi-Fi Protected Access is a data encryption specification for 802.11 wireless networks that replaces the weaker WEP. It improves on WEP by using dynamic keys, Extensible Authentication Protocol to secure network access, and an encryption method called Temporal Key Integrity Protocol (TKIP) to secure data transmissions.

WPA2. Wi-Fi Protected Access 2 is an enhanced version of WPA. It uses Advanced Encryption Standard instead of TKIP.

WLAN. Wireless local-area networks use radio waves instead of a cable to connect a user device, such as a mobile computer, to a LAN. They provide Ethernet connections over the air and operate under the 802.11 family of specifications developed by the IEEE.

Index

A

AC power 2-23
accessories
  cables 2-3
  CAM 2-3, 2-24
    installation 2-25
    USB connection 2-21, 2-25
  four slot charge only cradle 2-1, 2-17
  four slot Ethernet cradle 2-10
  four slot Ethernet/USB cradle 2-1
  four slot spare battery charger 2-1
  holster, quick release 2-2
  magnetic stripe reader 2-3
  MSR 2-21
    battery charging 2-23, 2-28
    installation 2-22
    magnetic stripe reading 2-23
    power connection 2-22, 2-25, 2-28
    serial connection 2-21, 2-23, 2-25, 2-26
  serial/USB cradle 2-1
  single slot serial/USB cradle 2-7, 2-31
    LED indicators 2-9, 2-20
  spare battery 2-2
  spare battery charger 2-19
    power connection 2-20
  UBC
    battery insertion 2-27
ActiveSync 3-2, 3-6
  deploying CAB files 6-9
adding programs
  from Internet 5-8
  using BootLoader 5-9, 5-11
AirBEAM
  deploying CAB files 6-10
application deployment 5-1, 6-1, 6-8
  CAB files 6-8
application folder 6-8
application packaging 5-1, 6-6
application security 6-1

B

battery charging temperature A-2
boot
  clean 1-2, 1-3
  cold 1-2, 1-3
  warm 1-2
BootLoader 5-5
  error messages 5-13
bullets xvi

C

CAB files 6-4, 6-8
  deployment via ActiveSync 6-9
  deployment via AirBEAM 6-10
  deployment via image update 5-8, 6-10
  deployment via storage card 6-9
Cable Adapter Module 2-3
cables 2-3
cache disk 6-8
CAM 2-3, 2-24
  installation 2-25
  USB connection 2-21, 2-25
certificates 6-3
clean boot 1-2, 1-3
cleaning mobile computer 8-1
cold boot 1-2, 1-3
communication setup
  ActiveSync on mobile computer 2-34
  serial communication 2-34
  USB communication setup 2-34
communication software

MobileDoxEthernet communication
installing MobileDox 2-12
configuration xiii
conventions
notational xv
copyfile 6-5
cpf file 6-4
CPU A-1
cradles
four slot charge only 2-1, 2-17
four slot Ethernet 2-10
four slot Ethernet/USB 2-1
serial/USB 2-1
single slot 2-7, 2-31
LED indicators 2-9, 2-20
spare battery charger 2-19
power connection 2-20
creating a splash screen 5-16
creating cpf file 6-4
creating splash screen 6-11

D

data capture xiii
DCP 5-1, 6-6
DCP for MC9090w xvi
decode distances A-6, A-8
DL focus A-12
HD focus A-14
SR focus A-10
decode zone A-5
decode zones A-7, A-9, A-15
DL focus A-11
HD focus A-13
deployment 5-1, 6-1, 6-8
CAB files 6-8
Device Configuration Package for MC9090w xvi
digital signatures 6-1
dimensions A-1
display . . . . . xiii, A-1
drop specification A-2

E

electro-static discharge
EMDK 5-1, 5-2, 6-6, 6-7
EMDK for eVC4 xvi
Enterprise Mobility Developer Kit for eVC4 xvi
error messages 5-13
ESD 2-4, 2-5
Ethernet communication
cradle config 2-13
modifying cradle settings 2-14
setting IP address 2-13
DHCP server config 2-13
installing iDockIt 2-12

F

file update 5-5
flash file system 5-3
copyfile 6-5
downloading partitions 5-5
non-FFS partitions 5-4
BootLoader 5-5
splash screen 5-5
partitions 5-3
copyfile 5-4
regmerge 5-4
regmerge 6-5
flash storage 5-3
four slot charge only 2-1
four slot charge only cradle 2-17
four slot Ethernet cradle 2-10
four slot Ethernet/USB 2-1
four slot spare battery charger 2-1

H

hard reset 1-2, 1-3
HD focus decode distances A-14
holster 2-2
humidity A-2

I

image update
deploying CAB files 5-8, 6-10
information, service xvi
installation
development tools 5-3, 6-7
Installing Window Mobile Device Center 3-1

K

keyboard A-1
keypads xiii

L

lithium-ion battery 1-1
locking EDA 6-2

M

magnetic stripe reader 2-3, 2-21
maintenance 8-1
memory . . . . . xiii, A-1

MobileDox
install 2-12
MSR 2-3, 2-21
battery charging 2-23, 2-28
installation 2-22
magnetic stripe reading 2-23
power connection 2-22, 2-25, 2-28
serial connection 2-21, 2-23, 2-25, 2-26

O

operating system . . . . . xiii, A-1
operating temperature A-2

P

packaging 5-1, 6-6
partition update 5-5
partitions
downloading 5-5
FFS 5-3
non-FFS 5-4
BootLoader 5-5
splash screen 5-5
persistent storage 6-8
pin-outs
accessory A-22
mobile computer A-18
Platform SDK 5-2
programs
adding from Internet 5-8
adding using BootLoader 5-9, 5-11
flash file system 5-3
provisioning 5-15
PSDK 5-1

Q

quick release holster 2-2

R

radios xiii
RAM 6-7
random access memory 6-7
RAPI 6-3
regmerge 6-5
RegMerge.dll 5-4
remote API 6-3
reset
hard 1-2, 1-3
soft 1-2
resetting 1-2

S

security 6-1
application 6-1
certificates 6-3
device management 6-3
digital signatures 6-1
locking device 6-2
remote API 6-3
serial/USB cradle 2-1
setting up a partnership
partnership 3-4
single slot serial/USB cradle 2-7, 2-31
LED indicators 2-9, 2-20
soft reset 1-2
software installation 5-15
BootLoader 5-9, 5-11
spare battery 2-2
spare battery charger 2-19
power connection 2-20
splash screen 5-5
creating 5-16, 6-11
SR focus decode distances A-10
storage 6-7
application folder 6-8
cache disk 6-8
persistent 6-8
volatile 6-8
storage card
deploying CAB files 6-9
storage temperature A-2
strap 1-1
stylus 1-1
Syncing
Installing ActiveSync 3-1
Windows Mobile Device Center 3-3

T

troubleshooting 8-5
turning the radios off
WLAN 1-6

U

UBC 2-27
universal battery charger 2-27
unpacking 1-1

V

volatile storage 6-8

W

warm boot 1-2
weight A-1
Windows Mobile Device Center 3-3
Wireless 1-5, 4-4
Wireless Manager 1-5, 4-4
WLAN 802.11a/b/g xiii
WPAN Bluetooth xiii

X

XML provisioning 6-4
    certificates 6-3

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